THE IRON TRADE REVIEW

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STRONG DEMAND

INDICATES NO MID SUMMER DULLNESS.

Abandonment of Southern Agreement—Northern Iron Still Firm—Manhattan Bridge Contract Awarded.

With the approach of July, when the usual mid-summer dullness is expected, there is no indication of such condition prevailing this year, as mills are so filled with orders that unless the heat should be intense, there will be little decrease in production. Almost the only apprehension has been in regard to the crops, the failure of which would have a depressing effect on the iron market, but government reports indicate large crops, and on the whole the present outlook for heavy business throughout the summer is most encouraging.

Southern Iron Prices Sag. The feature of the week in the pig iron market was the dissolution of the agreement of the leading producers in the southern field who united some time ago to maintain $14 Birmingham as the price for No. 2 foundry. The abandoning of this attempt to maintain prices comes at an inopportune time, as it is generally believed that buyers would have been compelled to pay $14. It is true that smaller interests have sold at lower prices, but their supply was limited. Within a few days iron has been sold as low as $13 Birmingham, but the leading producers are asking $13.50. Owing to this uncertainty as to prices, buyers of the southern product are hesitating, and the market is weak, but in sections in which sales of southern iron are not heavy the pig iron market is firm and shows a tendency to advance. This is particularly true in the east and in the Pittsburg and Cleveland districts. The strength of the Bessemer and basic irons is well maintained, and $17.50 is asked for Bessemer for third quarter delivery, while $17.75 has been paid for small tonnages. For No. 2 foundry $16.50 is the usual quotation, although this can sometimes be shaded. The demand for ferro-manganese has improved, and reports of renewing disturbances in the Russian districts, where the ore is obtained, indicate there will again be a scarcity.

Scarcity of Crude Steel. The situation in regard to crude steel has not improved. Sheet bars especially are scarce, and the strike at the mill of one producer in the Pittsburg district has delayed deliveries, but this strike is now settled.

The demand for plates for the steel car manufacturers is heavy and the requirements for new lake vessels will be large, as 13 new boats have been ordered, while steel for only six has been provided for. The American Ship Building Co. now has contracts for all but about 25 per cent of its capacity for the year 1907. Requirements for plates for two battleships will add a large tonnage in the near future.

Steel Bars and Shapes. About 100,000 tons of steel bars have been contracted for in the Chicago district, which will cover the requirements of nearly all of the large interests which contract annually. Orders for structural material come principally for bridges, as the time for contracting for buildings for this year has expired, and it is too early to anticipate requirements for 1907. The contract for the Manhattan bridge has at last been awarded at, in round figures, $6,500,000 to the Ryan-Parker Construction Co. The order for steel for this structure has not been placed, and not more than 3,000 tons will be needed for some time. The first heavy orders from San Francisco will probably be received in July.

Coke Market Improved The coke market has improved, and there has been considerable buying for the last half of the year. Furnace coke is in strong demand. The lower Connellsville region is rapidly increasing its product. The scrap market continues dull and prices are very unsatisfactory to the seller.

HEAVY RAIL SALES

Announced in New York.—Effect of Southern Competition in Pig Iron.

New York, N. Y., June 20.—The following are late rail sales, for 1906 delivery: Kalamazoo & Lake Shore Transportation Co., 4,600; San Jose & Santa Clara, 1,800; Western Maryland, 4,000; Baton Rouge & Hammond Eastern, 1,600; Chesapeake & Ohio, 2,000 additional; Ann Arbor, 1,000. For 1907 delivery, Missouri Pacific, 26,000; Union Pacific, 37,150; Chicago Junction Ry., 3,500; Florida East Coast, 11,000; Lehigh & Hudson River, 1,500.

The Pennsylvania R. R. took 181,000 of which the corporation supplies 90,500.

Alabama war in pig iron prices has reached here. More than 2,000 tons were sold at $13.25 and $13.50. Advance in northern iron is denied.

Ore Unloaders Ordered.—Contracts have been made for five Hulett ore unloaders with the Wellman-Seaver-Morgan Co., for the Gary plant. This is part of the first unit. The ore yard is being constructed to furnish ore capacity for four furnaces building. Contracts for bridges have not yet been let, but all specifications are drawn up and bids are in.

The Wheeling Steel & Iron Co., Benwood, W. Va., will shut down its plate and puddling departments next week for extensive repairs to the plant.

The Middletown Car Works has taken orders for additional cars for South America and is enlarging its plant at Middletown, Pa.

The West Foundry, Sharpsville, Pa., about to make extensive enlargements to its plant, almost doubling the present capacity.

THE WEEK IN IRON CENTERS.

PITTSBURG.

Prices Advancing on Bessemer and Foundry Irons.—A Strong Market.

OFFICE OF *The Iron Trade Review*,
521 PARK BUILDING, June 20.

After the flurry in the pig iron market last week when sales aggregating over 125,000 tons were made, market conditions in the Pittsburg district have been comparatively quiet, with pig iron still holding the center of the stage and prices advancing on Bessemer and foundry iron. The spread between Bessemer and foundry is less pronounced than it has been and furnace and stock reports indicate that both are scarce.

The strength of the market at this time of the year, when, as a general rule, the summer quiet begins to be felt, is out of the ordinary, but actual conditions are such as to warrant it. The scarcity of semi-finished steel is more pronounced this week than last, due in one case at least to a shut down of the Bessemer converting department of the Jones & Laughlin Steel Co., on account of a strike at its Soho furnaces. The trouble has been entirely settled, now, however, and the plant is operating fully and the ill effects of the strike will not be far reaching.

An advance in the price of sheet bars is expected today on the part of the Carnegie Steel Co., when the quarterly adjustment is made. The price will probably be fixed at $29 instead of the present $28 price. Sales have been made at the former figure within the past week by independent interests.

Some very heavy plate business has been placed and the steel car companies have specified in big tonnages against their contracts. The plate contracts for five lake freighters have been placed during the past month. Contracts for two battleships are expected next week and this will mean a large tonnage in plates and armor.

Pig Iron.—While no actual sales of large tonnages have been reported since the sales by W. P. Snyder and the Bessemer Association to the Cambria Steel Co., and the Republic Iron & Steel Co., last week, negotiations are pending for about 60,000 tons for third quarter and last half delivery. The corporation has not come out openly seeking July iron, but it is understood it will take all it can it is understood it will take all it can buy for that delivery, not having purchased any outside pig iron for June delivery. On account of the scarcity of Bessemer pig iron, and the prospects that this condition will continue well through the remainder of the year, the $17.25 quotations are no longer made and furnaces are holding for $17.50 as a minimum for third quarter delivery and one of the largest producers says he will not sell at a figure less than $17.75. This price has already been obtained on a small tonnage. The Youngstown Sheet & Tube Co. is now one of the big factors in the pig iron market and beginning August 1 will take practically the entire output of four valley furnaces, thus taking them out of the market. Four valley furnaces, that have been running on Bessemer, basic and foundry iron, will be blown out before August 1, according to present plans, and this will serve to make the scarcity more pronounced.

No. 2 northern foundry is now quoted $16.50, but this could probably be shaded 15c to 25c on desirable business. Furnace reports show low stocks and foundries are in many instances running on a week to week basis and when they come in will have to pay higher prices as a penalty for not buying two to three weeks ago. There has always been a hesitancy to buy on a declining market, but this time the brace came quicker than was expected. Basic is strong at $17 and gray forge is quoted $16.35, Pittsburg. We quote:

Bessemer Valley	$17.25 to 17.75
Bessemer, Pittsburg	18.10 to 18.60
No. 1 Foundry, Pittsburg	17.60 to 17.85
No. 2 Foundry, Pittsburg	17.10 to 17.75
Gray Forge, Pittsburg	16.35
Basic, Valley	17.00 to 17.25
Basic, Pittsburg	17.85 to 18.10

Ferro-Manganese. — Ferro-manganese foreign 80 per cent for prompt delivery, American seaboard, is quoted at $80 per ton. There has been an improved demand during the week under review. Foreign smelters of manganese ore report it next to impossible, on account of a renewal of troubles in Russia, to get their supply and it is predicted that there will be another spell of scarcity for the American importers of the metal.

Skelp.—There has been no change in this market, and while the mills are pretty well filled up on old contracts, there has been practically no new business and on narrow widths and light gauges we quote:

Bessemer grooved, 1.57½c to 1.60c; sheared, 1.65c to 1.70c; basic grooved, 1.60c to 1.65c; sheared, 1.65c to 1.70c; iron skelp, grooved, 1.65c to 1.70c; sheared, 1.80c to 1.85c.

Hoops and Bands.—There has been a slight revival in the hoop business and considerable new tonnage has been placed at the old prices. We quote:

Hoops, 1.90c in carload lots, and 2c on less than carload lots, bands, 1.50c base, half extras as per standard steel card. Prices f. o. b. Pittsburg.

Muck Bar.—We quote $29, nominal, on all pig metal muck bar, and report but little business being done.

Rails and Track Material.—Some very heavy inquiries for next year delivery are being figured on by the mills, although the actual new business booked for standard sections during the past week by mills in the Pittsburg district has been light, the only fair tonnage being 4,600 tons for the Kalamazoo, Lake Shore & Chicago Traction Co., of which 1,600 tons is for 1906 delivery and 3,000 for 1907. The demand for light rails is very heavy and the leading interest has advanced its prices $1 per ton on 16-pound, 20-pound and 25-45-pound sections. Mills have booked some very heavy orders and the light rail business is better now than it has been for two years, the market in the south being unusually good. Railroad spikes are in heavy demand and are quoted $2.15 to $2.20 per 100 pounds. We quote:

Fifty pounds and heavier, 500-ton lots, $32; light rails, 16 pounds, $31; 20 pounds, $29.50; 25 to 45 pounds, $29.50; angle bars for standard sections, 1.50c; spikes, $2.15 to $2.20.

Sheets.—Specifications against existing sheet contracts have been very heavy and while producers have not felt the effect of the recent $2 advance to any great extent as yet, the jobbers have no difficulty in securing the advance and in some instances premiums have been obtained for quick delivery. Sheet mills are very far behind on their deliveries and the scarcity of semi-finished steel is as bad as it has been. We quote:

Black steel sheets, box annealed, cold rolled, one pass: Nos. 11-12, 2.10c; Nos. 13-14, 2.15c; Nos. 15-16, 2.20c; Nos. 17-21, 2.25c; Nos. 22-24, 2.30c; Nos. 25-26, 2.35c; No. 27, 2.40c; No. 28, 2.50c; No. 29, 2.65c; No. 30, 2.75c. Galvanized, Nos. 10-11, 2.45c; Nos. 12-14, 2.55c; Nos. 15-16, 2.65c; Nos. 17-21, 2.80c; Nos. 22-24, 2.95c; Nos. 25-26, 3.15c; No. 27, 3.35c; No. 28, 3.55c; No. 29, 3.80c; No. 30, 4.05c. Corrugated roofing, $1.75 per square for No. 28 painted, 2½-inch corrugation; $3.10 per square for No. 28 galvanized, 2½-inch corrugation. Quotations f. o. b Pittsburg on large lots.

Structural Material.—The new business, particularly in heavy shapes has been good, and the mills are filled to their capacity for the next three months, deliveries having improved to the extent of two or three months since February, at which time mills were all the way from five to six months behind. At the present time the new bookings are slightly in excess of the output, a very satisfactory condition of affairs from the

mill standpoint. There are one or two good contracts pending which will probably be closed within the next week or ten days. The new structural mill of the Jones & Laughlin Steel Co., has had much to do with the improved deliveries, as it has turned out some very big tonnages since it started in full about May 1. We quote:

Beams and channels, 15 in., and under, 1.70c; over 15 in., 1.80c; zees, 1.70c; tees, 1.75c; angles from three to six inches, inclusive, 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.60c base.

Plates.—The plate situation has improved wonderfully within the past two or three weeks. Contracts have been placed for five lake freighters during that time and the steel car companies have specified very freely against their contracts. Prices are unchanged and we quote as follows:

Tank plate ¼ inch thick, 6¼ to 100 inches, 1.60c f. o. b. mill, Pittsburg. Extras are as follows per 100 pounds, boiler and flange steel plates, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates, varying not more than four inches, in width at ends, narrowest end not being less than 30 inches, 0.10c; complete circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1.00c. Gauges under ¼ inch to and including 3-16 inch plates on thin edges, 0.10c; under 3-16 inch to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Merchant Pipe.—Things have been running along in much the same old way, with a few good sized inquiries for line pipe out that are now being figured on. The prices on steel pipe are firm with the extreme discount 81 per cent and 5 off. We quote the official discounts on pipe, consumers' carloads, with jobbers' carloads one point higher.

	Steel		Iron	
Consumer's Carloads	Black	Galv.	Black	Galv.
⅛ and ¼ inch	71	55	67½	51½
⅜ inch	73	59	69½	55½
½ inch	75	63	71½	59½
¾ to 6 inches	79	69	76	66
7 to 12 inches	74	59	71	55½
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch	64	52	60½	48½
½ to 4 inches	71	59	67½	55½
4½ to 8 inches	67	55	63½	51½
Double extra strong plain ends, ¼ to 8 inches	60	49	56½	45½

Boiler Tubes.—Consumers are specifying freely on contracts and the demand for merchant and boiler tubes is active. We quote:

	Steel	Iron
1 to 1¼ inches	50	45
1¼ to 2¼ inches	62	45
2½ inches	64	50
2¾ to 5 inches	70	57
6 to 13 inches	62	45

Less than carload lots two points less.
2½ inches and smaller, over 18 feet, 10 per cent net extra.
2¾ inches and larger, over 22 feet, 10 per cent net extra.

Tin Plate.—The amount of new business being placed is comparatively small, consumers being pretty well covered on old contracts made at low prices, and mills are filled up for several months ahead.

We quote: $3.75 per base box, f. o. b. Pittsburg, 14 x 20 100-pound cokes, terms 30 days, less two per cent off for cash in ten days.

Wire and Wire Nails.—Considerable business has already been placed for delivery during the remainder of the year for smooth fence wire. On wire nails the new business is light and mills are about ready for the annual shut-down for repairs July 1. Prices are unchanged as follows:

Wire nails, jobbers' carload lots, $1.85; retailers' carload lots, $1.90, and less than carload lots, $2; painted barb wire, $2 for jobbers in carloads; retailers in carloads, $2.05, and less than carloads, $2.15, with 30c for galvanizing; plain wire, $1.70 to jobbers and $1.75 by carload.

Steel.—The Carnegie Steel Co., at its quarterly adjustment meeting today, will undoubtedly advance the price of sheet bars from $28 to $29 a ton. Independent interests have already secured as good as the advanced price and $28.50 Youngstown has been paid. There is a marked scarcity of semi-finished steel and Bessemer billets are selling at $27 Pittsburg; open-hearth at $28.

Merchant Bars.—There has been no change in the iron bar situation and producers are not selling below 1.50c base Pittsburg, plus freight to point of shipment. New business during the week has not been very extensive, and specifications against old contracts have been good. We quote:

Common iron bars, 1.55c, Pittsburg, in carload lots, 1.60c in less than carloads; for western shipment 1.50c base Pittsburg; Bessemer steel bars, 1.50c; plow and cultivator, 1.50c net; channels, angles, zees and tees, under three inches, 1.60c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds, of a size, 0.30c advance.

Steel Bars.—Persistent rumors to the effect that some producers have sold steel bars at 1.40c have been in circulation, but they cannot be verified and are not believed. Three big interests have refused business at this figure when it was offered; they are holding firm at 1.50c Pittsburg. Specifications on old contracts are heavy.

Old Material.—After the recent little flurry caused by the purchase of re rolling rails and heavy melting stock by the corporation, the scrap market has settled down again to the old routine quiet and no business of significance has been transacted.

We quote, gross tons, delivered: Heavy melting stock, $15.50 to $16; No. 1 cast scrap, $15 to $15.50; cast borings, $8.50 to $9; bundled sheet scrap $13.50; malleable scrap, $15.50; No. 1 railroad wrought, $17; low phosphorus scrap, $18 to $18.50; wrought turnings, $11 to $11.50 busheling scrap, $14 to $14.50; iron axles, $25.50 to $26; old rails, rerollers, $17.50.

Coke.—There has been considerable buying for the last half and during the past week several large tonnages for delivery over the remainder of the year have been sold. Furnace coke is in strong demand, but foundry coke is not particularly active at this time. Prices have held up very good and we quote $2.35 to $2.40 on furnace and $2.60 to $2.75 on foundry coke, although one or two of the better known cokes have brought higher prices. The lower Connellsville region is rapidly increasing its output. A few months ago the average of the lower district was about 90,000 tons per week. It is now well over 100,000 and increasing every month. The estimated output of the Connellsville district proper for the week ending June 9 was 271,829 tons and for the lower Connellsville region 104,275 tons.

Effingham B. Morris, chairman of the Cambria Steel Co. executive committee, says: "The earnings to date in 1906 are considerably ahead of the corresponding period of 1905 and business is excellent. There is, however, no intention of increasing the dividend, as $5,000,000 will be taken out of earnings and expended for improvements."

The Tacony Iron Co., it is reported, will operate the Durham furnace at Reiglesville, Pa., which it recently purchased from the Durham Iron Co. The furnace was run for years by Cooper & Hewitt of New York and the site has been occupied by a stack for many years.

Consular reports state that another cargo of 3,500 tons of steel rails, manufactured by the Altos Hornos de Vizcaya, has been shipped to Mexico and that 5,500 tons of iron ore is now en route from Bilbao to Philadelphia.

The Reading Iron Co. has blown out Keystone furnace at Reading, Pa., for repairs. It has been run continuously for two years. Its capacity is 1,800 tons a week.

REPUBLIC WAGE SCALE.

The wage scale for the year beginning July 1 was signed last Thursday after a four days' conference between the officers of the Republic Iron & Steel Co. and the Amalgamated Association of Iron, Steel & Tin Workers, held in the offices of the steel company, Frick Annex building, Pittsburg.

The only radical change over last year's scale was a differential granted by the amalgamated association for rolling steel on merchant mills. The differential will also apply to western independent mills, thus making the contracts signed by the Republic Iron & Steel Co., and the Western Bar Iron Association, with the amalgamated association, almost identical.

The change from last year is a provision that for rolling steel on merchant bar mills the differential as against rolling iron will be 12 per cent less for rollers and catchers and six per cent less for roughers. The hooper-ups, drag-outs and other assistants to have their wage differential settled between the lodge officers and mill superintendents, being regulated largely by local conditions.

On guide mills, including 7, 8, 9 and 10-inch rolling, the differential will be 9 per cent straight. Any reductions made in the wages of straighteners and hookers-up will be settled locally. The clause specifying the differential for the rolling of steel will be classed No. 1 in the agreement. Heretofore there has been no differential in the price paid for rolling iron and steel.

TWO FREIGHTERS LAUNCHED.

The steel freighter Henry H. Rogers, building for the Pittsburg Steamship Co., was launched at the South Chicago yard of the American Ship Building Co. at noon on Saturday last. This steamer is the second of the four 600-foot vessels now building for the company, to be launched. The Rogers was christened by Miss Marion H. Rogers, niece of the man in whose honor the steamer was named. At the conclusion of the launch the launching party was taken in a special train to the Auditorium hotel where luncheon was served. Mr. E. C. Collins, traffic manager of the Pittsburg Steamship Co., presided.

The steamer Wm. G. Pollock, building for W. H. Becker of Cleveland, was launched on Saturday morning last at the Cleveland yard of the American Ship Building Co., and was named in honor of Mr. Pollock by Mrs. W. H. Becker, in the presence of a throng of personal friends. A luncheon in honor of the event was given at the Roadside Club at four o'clock Saturday afternoon. The W. G. Pollock is 440 feet over all, 420-foot keel, 52-feet beam and 28 feet deep.

CHICAGO.

Heavy Contracting for Steel Bars.—Southern Agreement Dissolved.

Office of *The Iron Trade Review*,
1202 Monadnock Block, June 19

The dissolution of the Southern Furnace Association occurred last week through the discovery that some of its members had been secretly cutting prices. This association was formed a few months ago by the Tennessee, Republic and Sloss interests to maintain the price of southern irons at $14 Birmingham for No. 2 foundry, its influence being enlarged a few weeks later by the admission of the other groups of Birmingham furnaces. The break has visibly weakened the southern situation, one purchase of a fair sized quantity of iron having been made by a local melter on the basis of $13 for No. 2 foundry. Steel making requirements of local mills have developed a brisk trading in western Bessemer irons, the International Harvester Co. having purchased 6,000 tons as mentioned last week and the Illinois Steel Co., 5,000 tons. The Massillon Iron & Steel Co. also bought 3,500 tons foundry iron from a valley furnace during the week. There is little demand, however, for foundry grades. Except for a brisk trading in steel bars, the finished material market is without particular interest. Contracts for substantially 100,000 tons are said to have been taken for this product, which practically cleans up the business of the bulk of the interests who are in the habit of contracting once a year for their annual requirements. Additional contracts have been secured by the American Bridge Co. for an aggregate of 2,500 tons of structural shapes, all of it for western consumption. This company has also been awarded the contracts for the structural work of the buildings embraced in the first unit of the plant of the Indiana Steel Co., including the rail mill, open hearth plant, machine, blacksmith and carpenter shops, and store house, the total tonnage exceeding 50,000. The steel for the Maison Blanche store to be erected at New Orleans, amounting to 6,500 tons, is said to have been let to the Brown-Ketchem Co. The order for three more boats for 1907 delivery placed with the American Ship Building Co. last week, makes a total of 13 for that year's construction, and leaves the company with not more than 25 per cent of its available capacity for the next fiscal year. The steel requirements for six have been placed. There is a good demand for rails, the orders placed since our last report including 37,500 for the Union Pacific, 4,500 for the Kalamazoo Lake Shore & Chicago, and 700 for the Terre Haute Traction & Light Co. It is understood also that the Lackawanna mill secured the contract of the M. K. & T. for 21,500 tons.

Pig Iron.—By the abandonment of the agreement to maintain prices entered into by the furnaces in the Birmingham district some months ago, the southern market is once more thrown wide open. The price of $14 Birmingham for No. 2 foundry has been merely nominal for some time, obtained, as a general rule, only on small lots, and shaded persistently by the furnaces not embraced in the association. Alarmed at the inability to induce the big consuming interests to contract at this price for their major requirements and experiencing only a nominal demand from other sources, some of the parties to the agreement have been secretly cutting prices, and last Friday, on discovery of this fact, it was agreed to dissolve the association. The buoyancy maintained by virtue of the agreement has since vanished. One lot of southern iron, purchased on analysis, but in composition equivalent to No. 2 soft, was bought at Birmingham, while a number of transactions for smaller lots have been closed at prices ranging from $13.50 to $14. Northern irons are sympathetically weak, and the local price for No. 2 foundry and malleable Bessemer has declined to $18 Chicago. Two Chicago steel interests, the International Harvester Co. and the Illinois Steel Co., have bought in the aggregate 11,000 tons of Bessemer iron for steel making purposes, all of which tonnage, it is said, will be furnished by the furnaces at Mayville and Duluth. The Illinois Steel Co. has blown in its new stack at South Chicago. We have revised our quotations, as follows:

Lake Superior charcoal	$19.00
Northern Foundry No. 1	18.50
Northern Foundry No. 2	18.00
Northern Foundry No. 3	17.50
Northern Scotch Foundry	18.75
Ohio Strong Softeners No. 1	18.80
Ohio Strong Softeners No. 2	18.30
Southern Foundry No. 1	17.40 to 17.65
Southern Foundry No. 2	16.90 to 17.15
Southern Foundry No. 3	16.40 to 16.65
Southern Foundry No. 4	15.90 to 16.15
Southern No. 1 Soft	17.40 to 17.65
Southern No. 2 Soft	16.90 to 17.15
Southern Gray Forge	15.40 to 15.65
Southern Mottled	15.15 to 15.40
Southern Silveries (4 percent to 6 percent Silicon)	17.40 to 17.90
Jackson Co. Silveries, 8 to 10 percent Silicon	22.30 to 23.30
Alabama and Georgia Car Wheel	23.90 to 24.40
Malleable Bessemer	18.00 to 18.25
Standard Bessemer	19.30
Basic Iron	18.85

Iron and Steel Bars.—Trading in steel bars was active in the week under review, contracts being closed aggregating 100,000 tons. The 1.50c Pittsburg price is firm, and this entire tonnage was taken on that basis. Iron bars are in light demand, though without change as to price. We quote car load lots, mill shipments, Chicago delivery, as follows: Bar iron, 1.66½c;

soft steel bars and bands, 1.66½c, half extras; soft steel angles, less than 3 x 3, 1.76½c; hoops, 2.06½c base, full extras; old rail stock, 1.65½c. Jobbers report a good demand from stock, with prices firm. We quote bar iron, 2.10c full extras; soft steel rounds and squares, 3 inches and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by 1⅛-inch and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by 1⅛-inch and larger, $2 per 100 pounds base; flats, 4½ inches x 5 inches and 6 inches x 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half rounds, $2 per 100 pounds base; steel bands, $1.85 to $1.95 half extras; soft steel hoops, $2.30 to $2.40 full extras. Other sizes not mentioned above, $1.85 per 100 pounds base, plus half extras.

Sheets.—No change is noted in the sheet situation. The market is remarkably strong, the demand continuing of active proportions. Mill deliveries are slow, being from eight to twelve weeks late. Stocks of local jobbers are low, considerable difficulty being experienced in replenishing same. We quote mill shipments, Chicago delivery, as follows:

Nos. 8, 9 and 10, 1.96½c; Nos. 11 and 12, 2.01½c; Nos. 13 and 14, 2.06½c. Nos. 15 and 16, 2.16½c; box annealed; Nos. 18 and 20, 2.36½c; Nos. 22 and 24, 2.46½c; No. 26, 2.51½c; No. 27, 2.56½c; No. 28, 2.66½c; No. 29, 2.81½c; No. 30, 2.91½c. Jobbers' prices on less than carload lots from store are as follows: No. 10, 2.20c; No. 12, 2.25c; No. 14, 2.30c; No. 16, 2.40c; Nos. 18 and 20, 2.65c; Nos. 22 and 24, 2.70c; No. 26, 2.75c; No. 27, 2.80c; No. 28, 2.85c; No. 30, 3.30c.

Galvanized sheets, mill shipments, are as follows: Nos. 10 and 11, 2.56½c to 2.61½c; Nos. 17 and 21, 2.91½c to 2.96½c; Nos. 22 and 24, 3.06½c to 3.11½c; Nos. 25 and 26, 3.26½c to 3.31½c; No. 27, 3.46½c to 3.51½c; No. 28, 3.71½c to 3.76½c; No. 29, 3.91½c to 3.96½c; No. 30, 4.16½c to 4.21½c. From store, prices on less than carload lots are as follows: Nos. 10 to 20, 3.10c to 3.20c; Nos. 22 and 24, 3.25c to 3.35c; No. 26, 3.45c to 3.55c; No. 27, 3.65c to 3.75c; No. 28, 3.85c to 3.95c; No. 30, 5.05c to 5.15c.

Plates. — An improved demand is noted for heavy sheared plates. Specifications are freer and new tonnage is larger. The Cambria Steel Co. is now taking orders for universal plates, its new universal plate mill having been put in operation last week. Considerable business is being taken by this interest for early delivery, owing to the crowded condition of other manufacturers. Contracts for three more boats were placed last week with the American Ship Building Co., bringing the total up to 13 on its books for 1907 delivery. Prices are firmly maintained as follows:

Tank steel, ¼-inch and heavier, up to 100 inches wide, 1.76½c base; flange steel, 1.86½c base; marine steel, 1.96½c base; all full extras. Plates 3-16 inch thick, $2 extra; gauges, 7 to 8, $3 extra; No. 9, $5 extra. Less than carload lots, $5 extra. We quote from local stocks; tank steel ¼ inch and heavier, up to 72 inches wide, 2c to 2.10c; 72 inches to 96 inches wide, 2.10c to 2.20c; 3-16 inch up to and including 60 inches wide, 2.10c to 2.20c; 3-16 inch 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.15c to 2.25c; flange steel, 25c extra; heads, 25c extra.

Structural Steel.—The new tonnage closed by the American Bridge Co. is of encouraging proportions. It includes 900 tons for the Hunt and West building, Dallas; 150 tons, Rockford High School; 250 tons Scarritt building, Kansas City; 100 tons for government improvements on the Illinois & Mississippi canal; 600 tons for highway bridges in Indiana; 400 tons of fabricated bridge material for the Kansas City Southern, and 100 tons for the C. B. & Q. R. R. Brown-Ketcham Co., Indianapolis, has secured the contract for the steel to be used in the Maison Blanche store at New Orleans, amounting to 6,500 tons. Bids are being prepared for two more large buildings in Chicago, one to be known as the Heyworth building, and the other to be erected by Sprague, Warner & Co.

Prices are without change mill shipments, Chicago delivery, being as follows:

Beams and channels, 3 to 15 inches, inclusive, 1.86½c; angles, 3 to 6 inches, 1.86½c; angles, larger than 6 inches, on one or both legs, 1.96½c; beams, larger than 15 inches, 1.96½c; zees, 3 inches and over, 1.86½c; tees, 3 inches and over, 1.91½c, with the usual extras for cutting to exact lengths, punching, coping, bending, or other shop work.

Quotations on lots from store are as follows: All angles three inches and larger, including six inches, $2.25 per 100 pounds base; angles over six inches, $2.35 per 100 pounds base; tees, three inches and larger, $2.30 per 100 pounds base; beams, three inches to fifteen inches, inclusive, $2.25 per 100 pounds base; beams, eighteen inches and larger, $2.35 per 100 pounds base; channels, three inches and larger, $2.25 per 100 pounds base.

Rails and Track Supplies.—Contracts for standard sections placed this week include the 21,500 tons for the Missouri, Kansas & Texas which went to the Lackawanna Steel Co., and contracts for 37,500 tons for the Union Pacific, both for 1907 delivery. Several orders were placed for this year's shipment, including 4,600 tons for the Kalamazoo, Lake Shore & Chicago, and 700 tons for the Terre Haute Traction & Light Co. Light rails and track supplies continue very strong, early deliveries being impossible to obtain on either.

We quote, standard sections, f. o. b. mill, open-hearth rails, $29; Bessemer, $28; light rails, Bessemer steel, 30 to 45-pound sections, $27 to $28; 25-pound, $28 to $29; 20-pound, $29 to $30; 16-pound, $30 to $31; 12-pound, $31 to $32, and light sections down to 8-pound, $38 to $40, all f. o. b. mill. Track supplies are quoted as follows: angle bars, 1.50c to 1.75c; spikes (for quick shipment), 2.15c to 2.25c; (for forward deliveries) 2.05c to 2.10c; track bolts, 2.65c to 2.75c base square nuts.

Cast Iron Pipe.—Nothing unusual has transpired this week to make the market interesting. Routine orders are very good and aggregate a fair sized tonnage. Prices have been advanced 50 cents a ton this week, making a total advance of $1.50 in two weeks. We have revised our prices and quote as follows: Four-inch water pipe, $32.50; six and eight-inch pipe, $31; 10-inch and larger, $30; gas pipe, $1 extra.

Boiler Tubes.—No change is noted in the local situation. Demand is good and prices are uniformly maintained. We quote as follows:

	Steel	Iron	Seamless
1 to 1¼ inches	46.35	43.35	53.35
1½ to 2¼ inches	58.35	43.35	40.35
2½ inches	60.35	48.35	43.35
2¾ to 5 inches	63.35	55.35	
2¾ to 4¼ inches (Seamless)			50.85
6 to 13 inches	58.35	48.35	

Less than carload lots, from store, as follows:

	Steel	Iron	Seamless Steel
1 to 1¼ inches inclusive	40	35	42½
1¾ to 2¼ inches, inclusive	50	35	35
2½ inches, inclusive	52½	35	30
2¾ to 5 inches, inclusive	60	47½	42½

Merchant Pipe.—Business continues of good proportions, especially from the building trade, and the outlook is bright. Mills continue to quote ¾ to 6-inch black steel pipe, 79.35 per cent discount from list Chicago. Galvanized is offered at 69.35 discount Chicago. Quotations of local jobbers are without change, ¾ to 6-inch black steel pipe still being quoted at 76 to 77 per cent discount.

Wire Products.—The market continues in a very good condition. Demand is well maintained, the entire output of mills going into immediate consumption. There will be few, if any, shutdowns this year owing to enormous consumption of material and the fact

that no mill has yet been able to accumulate any stocks. We quote prices, as follows:

Wire nails, $2; painted barbed wire, $2.15; galvanized barbed wire, $2.45; smooth annealed wire, $1.85; smooth galvanized wire, $2.15; polished staples, $2.15; galvanized staples, $2.40. Carload lots to retailers, 5 cents higher than above prices; less than carload lots, 15 cents higher.

Coke.—The market is without any noticeable activity. Spot fuel is scarce and prices are holding better than formerly. We quote Connellsville 72-hour foundry brands from $2.75 to $2.90 ovens, or $5.40 to $5.55 Chicago. Wise County coke is offered at $4.85 to $5 Chicago, and Solvay coke at $5.50 on contracts, and $5.65 for immediate shipment.

Old Material.—There is nothing new to report in the Chicago scrap market. The same dull situation continues to exist, the only redeeming feature noticeable being the brisk demand that has been felt for heavy melting steel and rerolling material. Prices have sagged under the depression and it requires liberal concessions to bring out an order. We quote as follows; gross tons being mentioned in the first paragraph:

Old Steel Rails (4 feet and over)	$15.50 to 16 00
Old Steel Rails (less than 4 feet)	14.00 to 14 50
Old Car Wheels	18.00 to 18.25
Old Iron Rails	20 50 to 21.00
Relaying Rails, subject to inspection	27.00 to 27 50
Heavy Melting Steel	12.50 to 13.00
Mixed Country Steel	11.00 to 11.50

We quote net tons, as follows:

No. 1 R. R. Wrought	$13.25 to 13 50
No. 2 R. R. Wrought	12.25 to 12.50
Shafting	15.75 to 16 00
Dealers' Forge No. 1	11.25 to 11.50
Wrought Pipe and Flues	9 25 to 9.50
No. 1 Cast, 150 pounds and less	13.00 to 13.50
No. 1 Mill	8 25 to 8.50
Mixed Busheling (No. 1 & No. 2)	8.50 to 9.00
Country Sheet	7.25 to 7.50
No. 1 Boilers Cut	9 25 to 9.50
Boiler Punchings	11.00 to 11.50
Iron Car Axles	22 50 to 23.00
Steel Car Axles	17.50 to 18.00
Iron Axle Turnings	9.25 to 9.50
Cast Borings	7.00 to 7.50
Mixed Borings, etc	7.00 to 7.50
Machine Shop Turnings	9.00 to 9.25
Railroad Malleable	12.00 to 12.50
Agricultural Malleable	12.50 to 13.00
Stove Plate and Light Cast Scrap	10 50 to 11.00
Old Iron Splice Bars	16.00 to 16.50

CLEVELAND.

Scarcity of Foundry Iron and Prices are Firm.

OFFICE OF *The Iron Trade Review*,
BROWNING BUILDING, June, 19)

Iron Ores.—Shipments of ore continue in good volume and it is now estimated that the movement for June will be in the neighborhood of 5,500,000 tons. This will make the total movement for the year to July 1 slightly in excess of 11,250,000 tons, against 10,815,000 tons for the corresponding period of 1905. This is an increase of 425,000 tons, despite the heavy loss incurred by the longshoremen's strike. At this rate of increase, the movement for the entire season will be in the neighborhood of 36,000,000 tons. Some difficulty is still experienced in a shortage of cars on the range railroads, and this will probably become more acute with the heavier movement of midsummer.

Pig Iron.—A feature of the market is the local scarcity of foundry irons. The Toledo furnace, the Cherry Valley furnace and one of the Columbus Iron & Steel Co.'s furnaces are out of blast for repairs and the active furnaces are sold well into the fall, except for scattering lots. Business of the past week has been extremely active and the aggregate tonnage closed has been large. Prices locally are firm at $16.50 furnace, or $17.00 delivered Cleveland, though in districts where the influence of southern Ohio prices is felt, these figures are being shaded. The Barney & Smith Car Co. has closed for its entire requirements for the second half at $17.00 delivered Dayton. The tonnage is not announced, but was large; a part of it went to Columbus. A unique contract closed during the week was for a heavy tonnage of malleable iron at $16.75 furnace, deliveries to extend over a year beginning with October. Coke contracts for the second half are being closed at $2.75 ovens for foundry grades. For spot furnace coke, low prices are being quoted, and the situation will probably become still easier through the settlement of the bituminous coal strike. We quote, Cleveland delivery, as follows:

Bessemer	$18.10 to 18.35
No. 1 Foundry	17.25 to 17.50
No. 2 Foundry	17.00
No. 3 Foundry	16.50 to 16.75
No. 2 Southern	17.85 to 18.10
Gray Forge	16.35 to 16.85
Gray Forge Southern	15.85 to 16.25
Lake Superior charcoal	19.50 to 20.00

Finished Materials.—The rail market has been active of late and during the last ten days one interest has closed for a total of 10,000 tons, part for delivery this year and part for 1907. The bar iron trade is brisk and one producer has retired from the market for the present. A heavy demand for steel bars is noted, and considerable business is being closed. New contracts for structural materials and plates are not of great volume, but jobbers and quick delivery agents report a good demand. Manufacturers of excavating machinery are paying premiums regularly on good-sized tonnages. Sheet mills are far behind, on account of the absence of sheet bars and the new price is being maintained. Tin plates are selling readily from stock. Good sales of steel ingots are reported in this district: they are being employed as a substitute for billets in heavy work, the price of the latter, in many cases, being prohibitive.

Old Materials.—The scrap market manifests little change, and is extremely quiet. Some small lots of recent railway lists which came to Cleveland indicate, however, that fair prices were secured. We quote f. o. b. Cleveland, as follows:

Old iron rails	$20.00 to 21.00
Old steel rails (over 6 feet)	16.50 to 17.00
Old steel rails (under 6 feet)	16.00 to 16.50
Old car wheels	16 50 to 16.75
Steel boiler plate	12.00 to 13.00
Steel axles	19.00 to 20.00
Malleable iron (railroad)	15 00 to 15.50
Malleable iron (agricultural)	13.00 to 13.50
Heavy steel	14.50 to 15.00
Country mixed steel	13.00 to 13.50
No. 1 R. R. wrought	15.50 to 16.00
No 1 busheling	12.00 to 12 50
No. 1 machine cast	13.50 to 14.00
Iron axles	22.00 to 23.00
Axle turnings	10.50 to 11.00
Wrought turnings (free from cast)	9.00 to 9.50
Grate bars	10.00 to 10.50
Pipes and flues	11.50 to 12.00
Tank iron	10.50 to 11.00
Hoop and band iron	7.50 to 8.00
Sheet iron	6.50 to 7.00
Wrought drillings	9 00 to 9.50
Stove plate	10.00 to 10 50
Cast borings	7.00 to 7.50

CINCINNATI.

Southern Producers' Agreement Dissolved and Prices are Sagging.

June 19.

Pig Iron.—The most important development in the pig iron situation has been the reported dissolution of the southern producers' agreement to maintain pig iron prices at $14.00 Birmingham. It is said that on last Thursday this arrangement ceased to be in force with the result that each of the interests which had been parties to the agreement acted independently as to prices. Under this condition of affairs quotations became irregular and competition brought out lower prices for strictly Birmingham irons. At this writing the market is difficult to quote and all firm offers from $13.00 Birmingham up to $13.50 are being submitted, and the feeling in the trade is that the market is tending toward the $13.00 price. Northern iron is also weaker and lower prices in the Hanging Rock district have been made. In several instances prices of $15.75 f. o. b. furnace in the Ironton district have been unsuccessful in securing competitive business and one sale to an Indiana concern is reported to have been made at $15.50 at northern furnace. The unsettled condition of the market comes at a time when there is quite an increase in the amount of inquiry and buyers have shown more interest in the market. It is a matter of speculation in the trade as to whether the lower prices will have a tendency to bring about more liberal purchases or have the effect of causing buyers to hold off. The situation is so unsettled that it is impossible to forecast developments. We quote f. o. b. Cincinnati:

Southern Foundry No. 1	$16.75 to 17.25
Southern Foundry No. 2	16.25 to 16.75
Southern Foundry No. 3	15.75 to 16.25
Southern Foundry No. 4	15.25 to 15.75
Southern Foundry No. 1, soft	16.75 to 17.25
Southern Foundry No. 2, soft	16.25 to 16.75
Gray Forge	14.50 to 14.75
Northern Foundry No. 1	17.40 to 17.65
Northern Foundry No. 2	16.90 to 17.15
Northern Foundry No. 3	16.40 to 16.65
Jackson County Silvery, 8 per cent	21.15 to 21.65
Southern Charcoal	24.00 to 25.00

Finished Material.—Jobbers report a fairly active demand for nearly everything on the list with prices well maintained except that bars are said to be obtainable below the Pittsburg schedule in some instances. Structural shapes are still commanding premiums for prompt delivery.

We quote: bars at 1.63c, half extras, with dealers quoting 1.85c for iron and steel out of store. Galvanized sheets, No. 10 and No. 12, in car lots are 2.68c. We quote black sheets, No. 27 at 2.40c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.85c; No. 27, 2.75c; No. 16, 2.35c; No. 14, 2.25c; No. 12, 2.15c. Tank plates are firm and sell out of store at 2c to 2.10c for ¼-inch and 2.10c for 3-16, Nos. 8 and 10. Beams and channels are quoted at 2.25c to 2.35c from stock and angles at 2.10c to 2.15c for base sizes.

In merchant pipe there is a fairly good demand with prices unchanged, but there is believed to be a steadier tone to the market. We quote f. o. b. Cincinnati as follows:

MERCHANT PIPE.
(Basing Discounts)

	Steel Pipe		Guaranteed Wrought Iron Pipe	
	Black Per cent	Galv. Per cent	Black Per cent	Galv. Per cent
⅛ and ¼ inches	69.7	52.7	....	....
⅜ inch	73.5	61.3	....	....
½ inch	73.7	61.7	....	....
¼ to 6 inches	77.7	67.7	....	....
7 to 12 inches	72.7	57.7	....	....

Coke.—There is a fair inquiry for coke and foundries are showing interest in their second half of the year requirements. Some contracts are being placed. Offerings from most all districts are liberal. We quote prices in the leading coke producing district as follows:

Wise County, Va. Furnace Coke prompt shipment	$2.50 per ton
Wise County, Va. Foundry Coke on contracts	$2.65 to 2.75 per ton
Pocahontas Furnace Coke prompt shipment	$2.25 to 2.50 per ton
Pocahontas Foundry Coke on contracts	2.65 to 2.75 per ton
Connellsville Furnace Coke prompt shipment	2.50 per ton
Connellsville Foundry Coke on contracts	2.65 to 3.00 per ton
New River Foundry Coke on contracts	2.65 to 2.75 per ton
New River Furnace Coke, prompt shipment	2.50 per ton

†Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices on the following basis: $1.65 per ton on $9.00 pig iron, plus 17 per cent of the advance on pig iron above $9.00 Birmingham

Old Material.—While there is no change in prices, the market is easy in tone, dealers are cautious about making bids for the offerings. Melters are not buying and trade is draggy. We quote f. o. b. Cincinnati:

Old No. 1 railroad wrought, net tons	$14.00 to 14.50
Cast machine and foundry, net tons	12.50 to 13.00
Old iron rails, gross tons	20.00 to 20.50
Old steel rails, gross tons	15.50 to 16.00
Old short lengths, gross tons	16.00 to 17.00
Old iron axles, net tons	22.00 to 23.00
Heavy melting scrap, gross ton	15.00 to 15.50
Stove plate, net tons	10.00 to 10.50
Wrought turnings, net tons	9.50 to 10.00
Cast borings, net tons	7.00 to 7.50
Car wheels, net tons	16.00 to 16.50

PHILADELPHIA.

Basic Still the Strongest Pig Iron.—Decline in Production Expected.

June 19.

Pig Iron.—Basic iron has continued to lead the market in strength, and further large sales are reported. The Schuylkill Valley industry which was named last week as having bought some 15,000 tons has since added not less than 5,000 tons to its purchases. Most of this was taken at $17.85, but spot sales of small amounts have been made during the week at as high as $18. Gray forge has also been in demand, and one sale of 4,000 tons at $16.50 is reported. There has been a very noticeable increase in both orders and inquiries, especially for steel making iron, and this week is expected to witness a like gain in the demand for foundry iron. Most of this new business is confined to the third quarter. The reports of almost unprecedented sales in the Pittsburg market have had an encouraging effect on the trade and strengthened furnace men in their determination to make no concessions to secure business. The usual summer decline in production is expected soon, and with so many consumers following a hand-to-mouth policy in buying supplies, no difficulty is anticipated in maintaining prices at their present level. These are substantially the same as last week, as follows:

No 1X Foundry	$19.00 to 19.50
No. 2X Foundry	18.50 to 18.75
No. 2 Plain	18.00 to 18.50
Standard Gray Forge	16.25 to 16.50
Basic	17.75 to 18.00
Low Phosphorus	24.75 to 25.25

New Material.—No change is to be noted in conditions during the past week. While the mills would like to see orders coming in more freely, most of them have their tonnage sold up for several months ahead and see no reason to feel anxious about the future. Prices remain unchanged, as follows: Beams, channels and angles according to specifications, 1.83½c to 2c; refined iron bars, 1.63½c to 1.73½c; steel bars, 1.63½c to 1.73½c; plates, 1.73½c to 1.83½c.

Old Material.—With the exception of old car wheels, for which there is always a pretty steady demand, the scrap market continues very dull, with no indications of improvement. In several lines, indeed, there have been further concessions in prices, without, however, bringing new business. For the present prices may be quoted as follows:

Old steel rails	$16.00 to 16.50
No. 1 steel scrap	15.75 to 16.00
Old steel axles	19.00 to 19.50
Old iron axles	25.00 to 25.50
Old iron rails	19.50 to 20.00
Old car wheels	16.50 to 17.00
Choice scrap, R. R. No. 1 wrought	18.00 to 18.50
No. 1 yard scrap	16.00 to 16.75
Machinery scrap	15.50 to 16.00
Low phosphorus scrap	19.00 to 20.00
Wrought iron pipe	13.50 to 14.00
No. 1 forge fire scrap	13.50 to 14.00
No. 2 forge fire scrap, ordinary	9.50 to 10.00
Wrought turnings	12.00 to 13.00
Axle turnings, heavy	13.00 to 13.50
Cast borings	9.50 to 9.75
Stove plates	11.50 to 12.00

ST. LOUIS.

Break in Southern Agreement Came At an Unfortunate Time.

June 18.

The dissolution of the southern agreement to maintain pig iron at $14 Birmingham basis for No. 2 has had the effect of unsettling the market, though in reality the price has not been cut at all. Thirteen fifty, the new quotation sent out by the Republic-Tennessee, Sloss-Sheffield, and others who were affiliated in the agreement, has really been the market for weeks, though not given out as the regular quotation.

St. Louis iron men are all agreed that the breaking of the agreement at this time is most inopportune. Nearly every one interviewed today expressed the belief that, had the price been maintained thirty days longer at $14, all of the larger melters would have come heavily into the market. They would have been compelled to do so, for their supplies of iron are running low and they would of necessity have been compelled to replenish them as there is slight reduction in the amount which is being melted these days. The smaller outside furnaces have been booking practically all the business since the agreement went into effect and they are practically filled up with this business so that they could not continue to cut much figure. The larger melters would have had to turn to the larger furnaces in the agreement and would have been compelled to pay the $14, or do without iron.

Now that the price has been established upon a $13.50 basis there is a decided hesitancy. Founders always hesitate to buy on a declining market. While there is little indication that the price will drop lower melters would rather wait to see how conditions turn out. Apparently they would rather buy on a slight upturn than to buy as it touches bottom. Large melters who were about to let their orders at $13.75 and $14, are now holding off, buying only in one, two or three car load lots. If there should be any buying of quantity, it looks as if the price is sure to go back to $14.

Inquiries reflect the waiting tendency of the market. Foundries which

have inquired about 1,000 and 2,000 ton lots only order by the hundred tons. One firm in the Peoria district bought 1,000 tons of malleable Bessemer, dividing the order between a St. Louis and a Chicago house. This firm is still in the market for 1,500 tons of southern foundry. Another Illinois implement house purchased 300 tons of No. 2 foundry from a St. Louis house. A St. Louis melter who was in the market for 300 tons bought 100 tons at $13.75 and next day closed for the other 200 at $13.50.

Coke is becoming somewhat more active again. Many of the houses which stocked up in anticipation of a coal strike are beginning to run short and are entering the market. Prices run from $2.90 to $3.30, Connellsville, depending upon the grade.

Iron quotations, including the freight rate of $3.50 from Birmingham to East St. Louis, range as follows:

Southern No. 1	$17.50 to 18.00
Southern No. 2	17.00 to 17.50
Southern No. 3	16.50 to 17.00
Southern No. 4	16.25 to 17.75
Gray Forge	16.00 to 16.50

Finished Material.—While there is no abatement in the strike of the structural iron workers, there is somewhat more hope for a settement of affairs, or at least a resumption of work inasmuch as the strike has resolved itself into a fight among the unions themselves. Out of the conflict the contractors expect one set of workers to return to work. The new stock house for the Lemp Brewing Association, which will require 400 or 500 tons of steel, is the latest project of interest in the local field.

NEW YORK.

Improved Tone and Heavier Sales in Pig Iron Market.—More Inquiry For Foundry Grades.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., June 18.

Pig Iron.—The week has brought a decided improvement in the pig iron market. Consumers have altered their views and are more ready to talk business on the old level of prices. While sales have not been heavy and individual lots are small the total for the week is of larger proportions than that of the weeks preceding. The change has been brought about, not so much by altered conditions of supply and demand as by the great activity in steel irons and the numerous reports of furnaces being blown out for repairs or shifted to a Bessemer or basic product. Many of the general and machine foundrymen who have been waiting to see what change in price July would bring have come into the market for moderate lots of their favorite brands.

Local agents had no part in the heavy transactions in Bessemer and basic which were the sensation of the week in the Pittsburg district. No sales of basic came to light and purchases of Bessemer did not exceed a few hundred tons. Most of the business has been of the routine foundry variety including some gray forge taken by pipe works. There were sales of 600 tons of Alabama No. 2 and others of 200 and 300 tons. A number of purchases of Virginia foundry by eastern Pennsylvania melters were negotiated in this city. These sales were not large, ranging from 50 to 500 tons. The inquiries now out make a total of many thousand tons, the largest being one for 2,000 tons of various foundry grades and another for 400 tons of special analysis irons.

The coke market has quite recovered from the weakness due to the coal strike agitation. Sales for the week were more nearly normal than for some time past. There was one sale of 1,500 tons of foundry coke and many ranging from one to several carloads.

Ferro-manganese is again scarce, specifications on old contracts being in some cases difficult to meet. Rumors of renewed disturbances bring forward the possibility of a recurrence of the conditions prevalent last winter when the supply of Russian ore was for a time entirely cut off and the offerings fell short of the demand. The following are prices of pig iron at tidewater:

Northern No. 1 Foundry	$18.25 to 19.00
No. 2 Foundry	17.75 to 18.55
No. 2 Plain	17.50 to 18.00
No. 1 Southern Foundry	18.00 to 18.50
No. 2 Southern Foundry	17.50 to 18.00
No. 3 Southern Foundry	16.75 to 17.20
No. 4 Foundry	16.50 to 17.00

Pig Iron Certificates and Contracts.—Trading in warrants and contracts on the New York Produce Exchange was slightly more active although no great improvement can be expected until there is a greater supply of iron with which to do business. Prices suffered little change. There was a sale of 100 tons, June standard foundry, at $17.50, and another similar in quantity of No. 2 warrants upon which Sloss was delivered at $13.25. The following are to-day's quotations for standard foundry contracts:

Standard Foundry Contracts.

	Bid.	Asked.
June	17.00	17.50
July	17.00	17.40
October	17.00	17.40
November	17.00	17.25

Finished Iron and Steel.—The railroads continue to buy steel products enough to keep the demand in a highly satisfactory state. The purchase of rails for both 1906 and 1907 delivery during the week reached a total of about 75,000 tons. These figures may be further augmented within a day or two. Details will be found elsewhere in the present issue. In the structural field the railroads furnish the bulk of the new inquiries and nearly all of the current business. The taking of contracts for buildings is nearly at an end for the present year, for a purchaser ordering now could scarcely expect to have his enterprise under cover before winter, and it is still too early to consider projects for the building season of 1907. The railroads, on the other hand, are willing to begin work upon plans in the more distant future. The orders for shapes placed during the week were almost exclusively for small railway bridges.

The American Bridge Co. is experiencing the normal lull which comes at this time of the year. The total bookings of the first two weeks in June did not exceed 12,000 tons, and it is not expected that the present month will equal the records of the half year just completed. In July, however, orders will again begin to migrate. San Francisco promises to yield its first considerable contract then and the building trade in general will prepare for renewed activity.

The Manhattan bridge contract has finally been awarded and work is to begin without further delay. The award went to the lowest bidder, the Ryan-Parker Construction Co. The contract price for the steel work is, $6,493,223. The order for the steel has not as yet been placed, but there are reasons to believe that the order has been pledged. Some time may elapse before the specifications for the superstructure are acted upon, but some 3,000 tons of steel required to finish the anchorage will be needed at once. Of this amount 1,900 tons will be eye-bars and the remainder girders.

The market for plates and lighter fabricated materials has been quiet. Bar iron is held not too firmly at 1.50c Pittsburg.

The following are prices at tidewater: Angles, 3 to 6 inches x ¼ inch and heavier, 1.84½c; beams, 3 to 15 inches, 1.84½c; tees, 3 x ¼ inch and heavier, 1.89½c; plates, carloads, tank, 1.74½c; flange, 1.84½c; marine boiler, 2.41½c; refined iron bars, 1.64½c; soft steel bars, 1.64½c; sheets, No. 28 black, 2.50.

Old Materials.—The market has quieted down after the mild flurry caused by the big purchases in Pittsburg last week. The demand upon local holders was not affected, but it created a firmness which otherwise would not have been noticeable. Sales in this district were confined to a few lots of cast scrap taken by local foundries, one of 300 tons and another of 200 tons being reported. The following

are prices approximately f. o. b. tidewater.

Old iron rails	$21.00 to 22.00
Old steel rails, long lengths	15.00 to 15.50
Old steel rails, short pieces	14.50 to 14.75
Relaying rails	24.00 to 25.00
Old car wheels	17.00 to 18.00
Old iron car axles	26.00 to 27.00
Old steel car axles	19.00 to 19.50
Heavy melting steel scrap	15.00 to 15.50
No. 1 railroad wrought scrap	17.50 to 18.50
Iron track scrap	16.50 to 17.00
Wrought pipe	12.50 to 13.50
Cast borings	9.50 to 10.00
Wrought turnings	13.00 to 13.50

Metal Market

NEW YORK.

Pig Tin.—The price of tin has dropped steadily during the week and the market closes quiet. The following are today's quotations: Spot, 38⅛ to 39. June 38½ to 38¾; July, 38¼ to 38½; London: £177 and £176 10s. Arrivals for the month to date 1,255 tons; afloat, 3,170 tons.

Copper.—Buying on domestic account has been only moderate and the market remains fairly steady. Today's quotations: Lake, 18¾c to 18⅞c; electrolytic, 18⅜c to 18⅝c; casting, 18¼c to 18⅜c. London: £82.10s and £81. Exports for the month to date, 9,357 tons.

Lead.—The demand has been slightly better and prices are firm. Today's closings, 5.90 to 5.95; St. Louis, 5.90 to 9.92½. London, £16 15s.

Spelter.—The market has grown stronger under a good demand and prices, especially St. Louis, have advanced. Today's quotations: 6.15 to 6.25. St. Louis, 6.15. London, £17 10s.

Antimony.—Prices are unsettled and lower. Today's quotations follow: Cookson's and Hallett's, 25 to 26; other grades, 24c to 25c.

ST. LOUIS.

The breaking of the smelting pool has resulted in booming zinc prices. For the last three weeks there has been a steady rise of from $1 to $2 a week in the price of zinc in the Missouri and Kansas fields with a resultant increase in the price of spelter. There has been quite an active demand for spelter this last week. Some special brands have sold up to $6.25. Ordinary brands are not quotable as there is none for sale.

Lead rules quiet, though firm. The price of $5.90 is nominal, none being offered that low. Corroding and Missouri brands are held firm at $6.

CHICAGO.

Lead and spelter continue firm at the prices given below, but pig tin is steadily declining. Today the latter product is quoted at 38¼c to 38½c, according to delivery. Copper is without any change, though weakness is expected from the fact that the domestic production this year will exceed last year's output by 50,000,000 pounds. Quotations on Lake still rest at 18¾c to 19¼c, and casting at 18½c to 18¾c. Sheet zinc is strong, the market sustaining the advance of 10 cents per 100 lbs. It is now quoted at $7.75 list f. o. b. LaSalle in car lots of 60-lb. casks. Spelter and lead are both firm. Spelter for prompt delivery is offered at 6.15c to 6.25c for car lots; lead, desilverized, 6.10c to 6.20c for 50-ton lots; corroding, 6.60c to 6.70c for 50-ton lots. Cookson's antimony is quoted at 32c, and other grades, 29c to 30c.

The old metal market has a brighter appearance, though trading is still at low ebb. Prices are soft and concessions are required to bring out orders. We quote dealers' buying prices, as follows: Copper wire, 16¼c; heavy copper, 16c; copper bottom, 15c; copper clips, 15½c; red brass, 15¼c; yellow brass, heavy, 12c; yellow brass borings, 10c; red brass borings, 13½c; lead, 4½c; zinc, 4½c; tin foil, 31c and light brass, 8½c; pipe lead, 4½c; tea pewter, 23c.

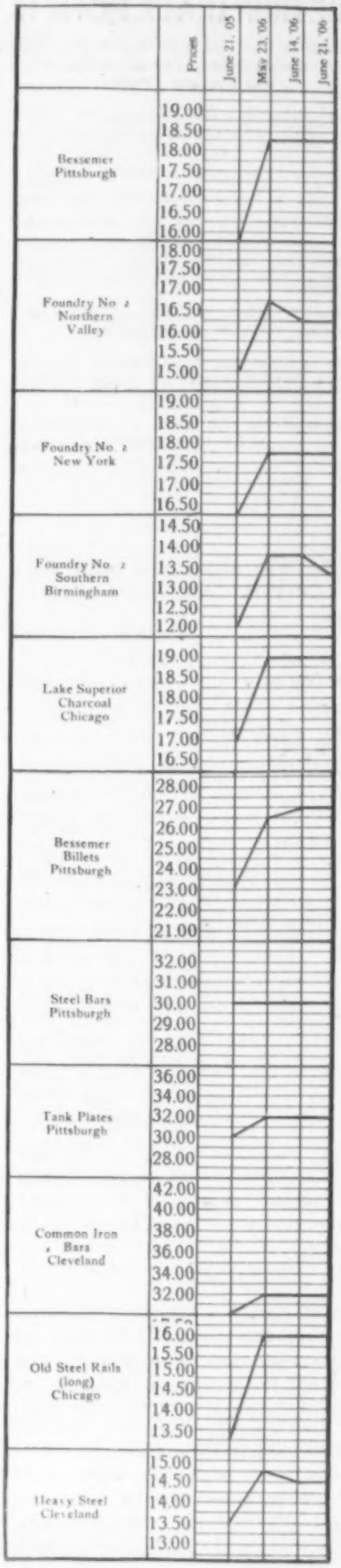
Iron Ore Consumed in 1904.—The total consumption of iron ore in 1904 in producing the 16,623,625 gross tons of pig iron made was 30,033,862 tons, valued at $100,945,369, as compared with 25,366,894 tons consumed in 1900, valued at $65,902,922. The average cost of the iron ore consumed in 1904 was $3.36 per ton, and the average quantity consumed per ton of pig iron made was almost 1 81-100 tons. In 1900 the average cost per ton of the iron ore consumed was almost $2.60, and the quantity consumed per ton of pig iron made was a little over 1¾ tons. The increased cost of the ore consumed in 1904, as compared with 1900, was about 76 cents per ton, or over 29 per cent. The consumption of ore per ton of pig iron made was about 3 per cent greater in 1904 than in 1900.

The Colorado Fuel & Iron Co. has located offices at 268-69 Bacon Blk., Cor. 12th and Washington streets, Oakland, Cal., where preferred attention is being given to San Francisco orders.

"The Fable of the Foundryman Who Was Willing to be Put Next" is the title of a clever little pamphlet being sent out on application to foundrymen by Rogers, Brown & Co., Cincinnati.

The Armour Institute of Technology was the recent recipient of a $23,000 gift from J. Ogden Armour for equipment purposes. This makes a total of $1,000,000 which has been given to the institute during the last five years.

PRICE CHART.



THE IRON TRADE REVIEW

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ELECTRIC IRON ORE SMELTING AT THE CANADIAN SOO.

The experiments recently concluded at the Canadian Soo on the electric smelting of iron ore, under the general direction of Dr. Heroult, of aluminum fame, appear to have been more successful than iron and steel metallurgists in general would have anticipated, but it is probable that if commercial results follow they will likely be in the direction of producing material other than ordinary pig iron, and from other than ordinary ores.

The final report to the Canadian government has not been made. Meanwhile, the authoritative information available regarding the experiments is contained in an address before the Canadian Club by Dr. Eugene Haanel, who as Dominion Superintendent of Mines presided over the experiments as the representative of the Canadian government, and Dr. Haanel's preliminary report to the Minister of the Interior.

In the statements thus made there is only a bare reference to the probable cost, this placing it at $10.69 per ton of pig iron. Even the full data, which are not given, could not be relied upon to give an accurate forecast, because the largest single item of expense outside of the ore is the electrical power, amounting to several dollars a ton, and the cost of electrical power cannot be predetermined where, as in this case, very extensive plants must be erected to utilize water power in a comparatively untried region. The experiments at the Soo seem to have indicated a production of 12 tons of pig iron per 1,000 horsepower days. The experiments witnessed a couple of years ago in France by the Canadian Commission on Electric Smelting showed for one set of experiments 5.76 tons per 1,000 horsepower days; for another set, making white iron, however, the showing was 12.12 tons. On the Soo experiments the favorable unit indicated is one of 1,500 horsepower, producing therefore about 18 tons per day. If $15.00 per horsepower per year can be done at the Soo, and the Hydro-Electric Power Commission's estimate for Niagara Falls is not much more than half as much while contracts in Canada have been made this year at $12.00, the cost per day for 1,500 horsepower would be $61.64, equal to $3.42 per ton of pig iron if 18 tons are produced per day.

The most important commercial results, however, do not lie in the direction of producing ordinary pig iron from ordinary ores. In the present course of manufacture, pig iron is only an intermediate stage, made necessary by the processes of smelting and subsequent refining which have been adopted. The smelting operation by the blast furnace leaves the pig iron with impurities which must be removed in the steel making. Hopes have been entertained that electric smelting could be so conducted that the intermediate form of pig iron would not be necessary; that, on the contrary, the electric smelting operation could produce steel directly. To ascertain to what extent, if any, such hopes have been borne out by the experiments at the Soo the final official report must be awaited.

On other important points the information now available is more explicit. It was proved that Canadian magnetites can be successfully treated by the electro-thermic process. Doubts had been entertained regarding magnetites, as compared with hematites, on account of the electrical conductivity of the former. It was proved also that ores high in sulphur can be made into pig iron, if not into a higher form of iron, containing only a few thousands per cent of sulphur, and that titaniferous iron ores, perhaps up to five per cent titanic acid, can be used, as shown by an ore containing 35 per cent titanic acid producing a pig iron of passable quality as judged by fracture.

Perhaps the most interesting conclusion of all is that roasted nickel-ferro-pyrrhotite can be made into a nickel-iron pig practically free from sulphur. If the operation could be refined a step farther, so that a nickel steel could be produced, the process would be of exceeding value.

The experiments showed that silicon could be varied at will, and that charcoal made from refuse and peat coke made from peat can be utilized without briquetting with the ore.

Exaggerated ideas should not be entertained as to gross results of electric smelting, even should the process prove entirely feasible, as the water power of the world is limited and the demand for electric smelting would be enormous. Thus, on the basis of 1,500 horsepower producing 18 tons per day, it can be estimated roughly that the total theoretical power of Niagara Falls would suffice only for producing the amount of pig iron made in the United States in 1902 or 1903. No such drain on any water power would be feasible, as the demand for power for other uses would advance the price.

LATENT STRENGTH OF THE STEEL MARKET.

Time and again the steel market has shown latent powers of recuperation which were a surprise even to those most influenced by nature and position to take a sanguine view of the future. Since the great boom of 1899 there have been several instances of this power. The boom of 1899 was in itself a striking example of recuperative powers, for, while a revival of industry was expected on all hands, the more general belief, even in the immediately preceding year, was that productive capacity had so outrun consumptive capacity that no relation could be restored which would mean more than the barest profits. In 1900 occurred a quick slump and a more ra-

tional recovery than that of 1899. In the latter part of 1903 there came another decline, and there was a recovery from it. Since that time the periods of weakness and recovery have been so numerous that it is not worth the space to refer to them in detail. In all these movements one general law can be observed, and that is that with each swing the pendulum covers less ground. With each successive upward movement, prices did not go so high, and with each successive downward movement they have not gone so low. Thus, we come up to the present. In the past three or four months there has been a slight downward swing, but prices have suffered scarcely at all, and at the present time there are indications of a slight upward tendency. It is hard to say just where the new tendency springs from; no especially large orders for finished steel products have been placed, barring the rail orders for 1907, which were given through special reasons. Evidence is simply cropping out at one point after another that there is a consuming power which is not satiated, and which bids fair to take the material.

Time and again of late the experts have thought they detected weak spots at minor points in the market, only to find in a short time an appearance of strength in that particular quarter.

Some of the changes in sentiment can be traced to railroad borrowing. When it is announced that a large loan is to be placed, the financial world is filled with forboding, but when the loan has been effected on favorable terms, there is corresponding elation, as the danger has been successfully passed, and the money is to be put into circulation.

Three months ago it was felt that another great buying movement was necessary before July 1, to carry the iron trade safely into the second half. No such movement has occurred, and yet the prospects are regarded as favorable, since if, as is the fact, the trade is able to get along without the general movement, so much more strength is shown, and so much more buying is deferred until early in the second half.

THE COMING DEMAND FOR STEEL COACHES.

In the installation of the New York subway service seemingly every precaution against the danger of fire was taken except the elimination of all combustible material from the rolling stock. It was thought that the fireproof nature of the tunnel itself and the highly perfected apparatus for preventing collisions would sufficiently safeguard the lives of the passengers. In spite of all precautions several collisions have occurred and one on June 1 resulted in the destruction by fire of two copper sheathed wooden cars and the serious damage of the seats and interiors of two steel cars. Fortunately there was no loss of life.

Chief Engineer Rice in his report to the rapid transit commission remarked that the accident showed forcibly that "no parts of cars used in subway service should be constructed of inflammable material." The conditions of underground traffic render it difficult to extinguish fires, but conflagrations are no more likely to occur below the surface than upon any line above ground. Moreover, on lines outside municipal fire districts there is no better provision for extinguishing flames when once started, and loss of life by fire is quite as common since the introduction of electric lighting and heating by steam or electricity as in the days of the old coach stove and oil lamps. The condemnation of the engineer, therefore, applies with equal force to almost every transportation line in the country.

It is now quite certain that none but steel cars will hereafter be built for underground service, and it seems to be only a question of time when the public will refuse to ride in any but thoroughly fireproof coaches on any railway. The all steel construction seems to be the only one that at present meets the requirements. Are our mills prepared to meet the enormous demand which is surely coming?

EXPORT DUTIES ON IRON ORE.

The idea of conserving iron ore supplies by an export duty is one which will not down. The proposition in Sweden was recently laid on the shelf for a period of five years, and now a similar movement has been started in Russia. A report of the Kharoff Iron and Steel Committee presented by M. Zimofsky to a conference of representatives of the iron and steel industry recently held at Kharoff favored the imposition of an export duty on iron ore, but the conference itself opposed the move. The Russian iron ore export movement began in 1901, when domestic troubles interfered with consumption, and in the five years some 787,000 tons have been exported, almost wholly the red hematites of the Krivoi Rog, which furnish nearly all the ore used in Russia. These deposits are not extensive and several times have appeared to be on the verge of exhaustion, which appearance led some years ago to the opening of the Kertch deposits, in the Crimean peninsula. These are phosphoric and friable, but are estimated to amount to 450,000,000 tons. The mining of them has decreased of late, only 200,000 tons being raised in 1905. Had the same feeling prevailed in Spain years ago which has lately manifested itself in Sweden and Russia, there is no doubt that an export duty would have been put upon Spanish ores, to the detriment of the British iron industry, which perhaps more so formerly than of late has thrived greatly on the use of Spanish ore. There is no telling but that a similar feeling may crop out in the United States some time, when it will of course take the form of referring to the iron and steel products made from the ores of the United States, as the ores themselves are not exported to any extent and the possibility of their being exported becomes more remote every year. A constitutional amendment to permit an export duty would, however, be necessary in the United States and that is a very distant possibility.

The students of the Carnegie Technical Schools have issued "The Thistle," the annual book published by the students. It is 10½ x 8 inches, bound in blue cloth with gold letters, and contains about 200 pages. The material in the book comprises a sketch and a photograph of Andrew Carnegie, photographs and sketches of the faculty, a list of students, pages devoted to athletics and various pieces of light literature, comprising stories and "grinds" on the faculty of the schools.

STEEL OUTPUT

OF THE TENNESSEE COMPANY WILL BE DOUBLED.

Extensive Improvements, Costing Three Millions, To Be Made.

The directors of the Tennessee Coal, Iron & Railroad Co. have approved plans and authorized the expenditure of about $3,000,000 for the extension of the company's steel plant. This work, when completed, will double the capacity of the rail mill and render the various operating departments modern in every way and in mechanical equipment as nearly as possible perfect. Charles J. Barr, of the Lackawanna Steel Co., has been engaged to take charge of the construction work. He will be assisted by J. H. La Fevre, also until the acceptance of his new position an employe of the Lackawanna Steel Co. George L. Collard, whose connection with the Tennessee company was recently announced in these columns, will be in command of the blast furnaces.

The plans as outlined by President Topping are very extensive, so broad that the details can not be given at present. It is the purpose of the owners to develop the property of the company in all its many developments, embracing blast furnaces, finishing mills, coal, coke, iron ore and transportation. Large sums have been set aside for this purpose. The blast furnaces will be rehabilitated and the production of the open-hearth department will be greatly extended. This will involve the erection of an entirely new plant, the work being carried on without interfering with present operations. After this has been completed, the present plant will be completely reconstructed, a section at a time, so that finally the open-hearth plant in its several parts will conform to a general plan and will be thoroughly modern and up to date in all its details.

The plans also include changes in the rail mill; the extension of the soaking pit and heating equipment of the plant; reconstruction of the yard; the installation of a complete traveling crane system, and additions to the steam plant and the gas producing equipment. The Bessemer plant will have many improvements, including the addition of a new converter and the installation of a new mixer. The blast furnace will be thoroughly overhauled. There will be new stoves, new steam boilers, and a large central electric power station where the energy in the surplus gases of the blast furnaces will be converted into electric power and from there transmitted to the finishing department. At the furnaces the bin system will be rearranged and coal, coke and ore docks reconstructed, so as to permit the storing of stocks of raw materials. No department of the works will escape a thorough course of overhauling.

Furnace Improvement.

The three blast furnaces of the Republic Steel Co. at Thomas only a mile distant, are already undergoing extensive repairs and improvements involving the expenditure of more than $500,000. New stoves are being built, Allis engines installed, a pig casting machine is being put in place and various other changes are under way.

The management of the properties of the two companies in the south has been consolidated, and will hereafter be operated and directed according to a common policy.

The officers contemplate starting up the sheet and plate mills of the Birmingham rolling mill which have been idle for the past six months. Two open-hearth furnaces of the Republic company are now in operation after a thorough overhauling and are producing standard sized ingots which are shipped to Ensley for finishing. Heretofore only small, bottom-cast ingots were produced and these were broken down in a small three-high mill. The present management finds it more advantageous to operate on different lines.

The Labor Problem.

The company is also expending large sums with a view to improving labor conditions by making the district more attractive to a laboring population. Houses are being built, boarding houses erected and other improvements are being added all for the comfort of the employes.

Southern manufacturers are waking up to the necessity of securing a population for that section of the country to carry on the many industries which are rapidly growing up there. The labor question is a serious one especially in the iron districts. A meeting was recently held by the board of trade of Atlanta, Ga., with a view to co-operating with the commissioner of immigration in New York to divert some of the streams of immigrants which pour into the country to the southern field which offers excellent opportunities for a laboring class. The Tennessee C. & I. Co. has joined in this movement. Within the past few weeks more than 200 men have been sent to the south from New York.

"The labor question will undoubtedly cause less trouble in the future," remarked President Topping. "The prejudice against the climatic conditions of the south is rapidly disappearing. That old prejudice is founded on nothing at all. We do have longer periods of warm weather down there, but the climate is more equable than in the north. There are not the sudden changes and the extremes of temperature. Besides, the mountains and the elevated regions serve to temper the heat."

PRODUCTION LIGHT.

Many Furnaces Out of Blast in the Birmingham District.

Birmingham, Ala., June 19.—Pig iron production in this district is still at the low water mark with no indications of an early improvement. The statement is made that several furnaces undergoing repairs are approaching the completion stage but labor is so scarce that the work progresses with but little haste. The Alabama Consolidated Coal & Iron Co. blows in its No. 2 furnace at Ironton this week, while it is believed the Trussville furnace of the Lacey-Buck Co. will be out for some little time undergoing repairs. The Sloss-Sheffield Steel & Iron Co. states that there is no telling when the city furnace recently repaired will be ready for the torch. The delay has been caused by the fire which destroyed the stock house and bins at the furnace plant. The Tennessee Coal, Iron & Railroad Co. will shortly have a furnace at Robertstown, near Bessemer, twelve miles south of Birmingham, ready for the torch. No. 5 furnace at Ensley is nearing completion but it is given out that as soon as this is started up No. 4 furnace will be blown out for practical rebuilding. The production of basic iron is uppermost in the minds of the Tennessee Co. as far as Ensley and immediate vicinity goes.

Shipments of pig iron are somewhat improved. The falling off of last month is reflected by the report of the Alabama Car Service Association which handled 59,413 cars against 62,194 in May, 1905. The home consumption of pig iron is well maintained, though foundrymen report that order books are not so well filled as a year ago. Cast iron pipe plants are still producing to the maximum. The big Sheffield plant will shortly be in full operation.

The United Mine Workers of America, Alabama district No. 20, have decided to renew the old contract with such operators as treat with the union miners in this district. At the joint conference held June 18, the scale committee of the miners presented the proposition to renew the contract now in effect, mining wage ranging from 47½ to 57½ cents per ton based on the average selling price of pig iron, ranging from $8 to $11.50 per ton. Col. T. G. Bush, of the Alabama Consolidated Coal & Iron Co., the only iron company treating with the union miners, announced that he would meet the committee of the miners and sign up the contract for one or two years. A number of commercial coal operators announced a similar decision. The indications are that not a single iron or furnace company not now dealing with union labor will decide to change the open shop plan and sign a contract with the union men.

CINCINNATI STEEL FOUNDRY IS STARTED.

The first official run of castings at the new plant of the Cincinnati Steel Foundry was made June 14 in the presence of officers and members of the Cincinnati Industrial Bureau, through whose efforts the plant was established. It consists of a foundry building, of steel, 135 x 260 feet, with an administration building adjoining and represents an investment of about $125,000. One acid open-hearth furnace is already in operation and a basic furnace will be completed by July 15, when the foundry will have a capacity of 1,000 tons of castings a month. Its output for seven months ahead has already been booked, and a continuance of business is certain as Cincinnati has about 30 machine tool plants besides other industries which require steel castings. At the test run an elaborate luncheon was spread in the pattern room and President William Lodge acted as toastmaster, explaining the main features of the enterprise and distributing souvenirs in the shape of miniature steel anvils, cast in the plant. Mr. Lodge stated that if the business grows, as it now promises, it will not be long before Cincinnati will have one of the largest steel casting plants in the United States. It is in charge of C. G. Robinson, formerly with a similar plant at Peru, Ind.

NEW ENGLAND FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the New England Foundrymen's Association was held at the Point Shirley Club, Winthrop, Mass. Dinner was served at 1:30 p. m., after which the routine business was disposed of in the usual manner, President Walter B. Snow presiding.

The secretary reported the death of Mr. George B. Buckingham, ex-president of this association, and also stated that flowers were procured and the association was well represented at the funeral. The president appointed Messrs. H. A. Carpenter, J. A. Colvin and P. Shields a committee to prepare resolutions on the death of Mr. Buckingham.

Announcement was made that the July meeting would be held in the shape of an outing to Bass Point, Nahant, Mass.

The president then introduced as the speaker of the day, Mr. Frederick R. Boocock, secretary of the American Anti-Boycott Association, who confined his remarks to the objects and benefits of that association.

The Ceylon graphite deposits are being invaded by outside mining interests and the primitive and inefficient method in which they have heretofore been worked is giving way to a more scientific operation. Largely increased production is anticipated.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA AT THE EDGAR THOMSON PLANT OF THE CARNEGIE STEEL CO., BESSEMER, PA., JUNE 16.

ENGINEERS' SOCIETY

Visits Edgar Thomson Works.—Gas Driven Blowing Engine Inspected.

The Engineers' Society of Western Pennsylvania, to the number of about 200, paid a visit to the Edgar Thomson Works of the Carnegie Steel Co., at Bessemer, Pa., Saturday afternoon. Although the Bessemer converters had completed the work of the week and were idle and the No. 3 rail mill was not in operation, the members of the society found many objects of interest in the huge plant and spent a couple of hours on the inspection tour. Particular attention was paid to the concrete retaining walls for the ore bins now under construction. These are 30 feet high and 1,300 feet long and will make the plant thoroughly modern in the handling of its ore supplies. The two 1,500-horsepower motors, driving one of the rail mills, were also an object of considerable interest, but the experimental gas-driven blowing engine held the center of attention.

This engine, originated and built by the Westinghouse Machine Co., has been at work for several months on an ordinary manufacturing load and has been subjected to the most severe tests for durability, reliability and efficiency. It was installed largely for experimental purposes and the data and experience which have been accumulated through its operation are being used in the construction of three large engines shortly to be installed. Two of these will be for blowing and one for electric generation, each with a rated capacity of about 2,000 to 2,400 horsepower. The foundations for these new engines are now being put in place. Fuel and gas are obtained from two or more of the Bessemer group of furnaces and a special cleaning plant, now in service to remove the dust, can deliver gas to the engines cleaner than the surrounding air. This plant comprises dry dust catchers, vertical wet scrubbers and a radial cleaner.

The party paid a visit to the lock on the river adjoining the plant and saw the workings of the heavy gates.

The Northwestern Iron & Steel Co. has acquired a tract of 1,500 acres of land adjoining the city of Kirkland, Wash., on which it will erect a steel plant to cost, according to reports, about $5,000,000.

Stockholders of the Featherstone Foundry & Machine Co. meet July 5 to vote on a proposition to increase the capitalization from $250,000 to $450,000.

PERSONALS.

Charles Dinkey, of the Edgar Thomson Steel Works, is in Europe.

Albert Ladd Colby has sailed for Europe to attend the July meeting of the Iron and Steel Institute.

H. T. Potter, of Pittsburg, is president of the H. T. Potter Co., just organized at Pittsburg to deal in contractors' supplies.

M. W. McDonald has moved his offices from 414-415 Providence Bldg., Duluth, to 726-728 Andrus Bldg., Minneapolis.

George H. McKinley has been made superintendent of the foundry of the Root & Van Dervoort Engineering Co., East Moline, Ill.

Geo. H. Baush has been placed in charge of the offices which Hill, Clarke & Co., machinery dealers of Boston, are opening in Philadelphia.

E. N. Ohl, of the Cherry Valley Iron Co., and the Sharpsville Furnace Co., has sailed for Europe, where he will spend about two months.

E. W. Pargny, first vice president of the American Sheet & Tin Plate Co., will return next week, after a three months' trip through Europe.

J. H. Slade, who has been chief draftsman at the South Atlantic Car & Mfg. Co., Savannah, Ga., has been made superintendent, succeeding Arthur B. Cummings.

Rudolf Becker has taken over the business of the Aluminum & White Metal Mfg. Co., Whitestone, L. I. William Gottlob ceases to be a partner in the firm.

Thomas Mitchell has been made superintendent of the Chester, Pa., plant of the American Steel Foundries. He is succeeded as assistant superintendent by Charles Lidstone.

John Y. Brooks, formerly with the Colorado Fuel & Iron Co., and the American Steel & Wire Co., has been made superintendent of the Southern Steel Co.'s plant at Ensley, Ala.

S. G. Gilfillan, secretary of the Belfont Iron Works Co., at Ironton, responded to the toast "Good Fellowship" at the American Hardware Manufacturers' Association meeting at Hot Springs, Va., last week.

C. K. Leith, professor of geology in the University of Wisconsin, is at work during the summer completing a survey and map of the iron fields of Utah. Some time ago he surveyed and mapped the Mesabi range.

Hugh S. Laing, formerly assistant manager of the New York branch of the Armstrong Mfg. Co., Bridgeport, Conn., has been placed in charge of the Chicago office and warerooms recently opened at 23 South Canal street, where a full line of the company's products is carried.

Dr. William Kent, dean of the L. C. Smith College of Applied Science of Syracuse University, sailed on the steamer "Patricia", on June 16, for a three months' tour of England, Scotland, Germany, France and Switzerland.

Albert A. Gery, president of the Consolidated Hardware Co., of Reading, Pa., and active in other enterprises, has been elected a director of the Farmers' National Bank at Reading, Pa.

Robert Black, who has been connected with the Cincinnati office of Hickman, Williams & Co., for the past two years, has associated himself with the Robert Fields Sales Agency, and will be located at the Cincinnati office. He was for a time secretary of the Southern Pig Iron Association.

John N. Reese, for several years superintendent of the blast furnaces of the Steelton plant of the Pennsylvania Steel Co., has resigned to take the superintendency of the furnace of the Pulaski Iron Co., at Pulaski, Va. He will be succeeded by James Gledhill, assistant superintendent.

Dr. Schuyler Skaats Wheeler, president of the Crocker-Wheeler Co., Ampere, N. J., sailed on June 14, on the Lloyd steamship "Barbarossa", for a short European trip. He was accompanied by Prof. Francis B. Crocker, professor of electrical engineering at Columbia University, who has been associated with him in business for many years.

OBITUARIES.

W. H. Bramble, noted as the inventor of the Yale lock and a number of other appliances, died June 9 at the home of his daughter in Decatur, Ill. He was 83 years of age.

George B. Buckingham, owner of the Arcade Malleable Iron Co. and the Worcester Malleable Iron Co., Worcester, Mass., died June 7 at the age of 58. He was president of the New England Foundrymen's Association from 1900 to 1901 and was first vice president of the American Foundrymen's Association in 1902. He was connected with a number of banking, trading and social organizations.

James M. Hodge, treasurer for the Crane Iron Co. of Pennsylvania for the last fifteen years, died at his home in Catasauqua on Saturday, aged seventy-three years. He was instructor in Wyoming Seminary, at Kingston, Pa., after graduating from Union College, and was at one time a lay preacher in the Methodist church. Before becoming connected with the Crane company he was with the Pennsylvania railroad.

NAILS AND FENCING

May Be Made by Dominion Iron & Steel Co.—Shortage of Labor Prevails.

Toronto, Can., June 18.—It is understood that the Dominion Iron & Steel Co. is considering adding to its Sydney, N. S., plant a mill for manufacturing wire nails and galvanized, barbed and woven wire fencing from the output of its rod mill. The market for steel rods has so far been found insufficient to keep the rod mill steadily in operation to its full capacity of 70,000 tons per year. This circumstance, combined with the steadily increasing demand from the northwest for fencing and nails, strongly points to the desirability of such an expansion. H. E. Rice, formerly superintendent of the rod mill, under whose management it made the world's record of 7,400 tons for a continuous month's run, has left Sydney for Atlanta, Ga.

A shortage of unskilled labor is experienced in connection with both the iron and coal industries of Sydney, N. S. The output of the Dominion Iron & Steel Co.'s mines at Wabana, Newfoundland, has fallen off from this cause and ore cannot be obtained fast enough to allow the steamers chartered for its conveyance to the plant at Sydney to make regular trips. The Dominion Coal Co.'s mines also find it difficult to get unskilled labor and production is falling off. Low wages as compared with those offered by contractors is assigned as the cause. The pay of unskilled laborers at the steel works is $1.40 a day, and those engaged at the mines receive $1.50. An early increase in these figures is expected, as the only means by which normal production can be restored.

The Canadian Westinghouse Co., of Hamilton, Ont., has just completed the largest electrical generator ever made in Canada. It is 2,000 horsepower.

PENNSYLVANIA STEEL PLANT.

The Pennsylvania Steel Co. expects to have its new open-hearth plant completed about the first of the year. Work is now being pushed on the foundation work. There will be five furnaces in the department, each furnace of 75 tons capacity, making them the largest in Pennsylvania from all accounts. The completion of these furnaces will give the company 17 open-hearth furnaces and largely increase its output. A hot metal railway will be constructed from the four blast furnaces to reach this new department, which will be located on the site of the old frog and switch department buildings, not far from the general offices. The company is also advancing its coke plant at Steelton. All of its furnaces and departments have been running this month and the output has been large.

U. S. Steel Corporation's Great Plant at Gary, Ind.

Herewith is reproduced for the first time in any publication a comprehensive diagram of the plant of the Indiana Steel Co., which the United States Steel Corporation is building at the extreme southern end of Lake Michigan, in Lake county, Indiana. The other illustrations accompanying it show the platted sections of land on which the town of Gary will be built and a plan view of the adjoining territory. Sandy dunes and scrubby headlands have hitherto been the most conspicuous feature of this site, but no more will hunters and fishermen wander through their labyrinths, for here is to be built the largest single steel plant of the world and a city that will be as perfect, healthful and beautiful as money and the best engineering talent can make. It is expected that ultimately 15,000 men and boys will be employed in the works and that the population of the town will grow to 100,000.

The construction of the works and town will proceed with equal despatch and regularity in order to provide homes and employment for the workmen and their families. Both will be built in such a manner as to permit indefinite expansion as later needs shall dictate. Substantially, 6,000 acres of land have been secured by the Steel Corporation, and all that portion lying north of the Grand Calumet river, amounting approximately to 1,280 acres, or two square miles, will be devoted to the requirements of the plant.

Plan of Construction.

The enterprise is to be of such gigantic proportions that its construction must be on a unit plan. The diagram shown on the accompanying insert is but a tentative arrangement, as only the most fundamental details have thus far been worked out. Therefore, this article contains nothing more than a recital of these and a general resume of the whole. Further elaboration may compel minor changes, but it is not expected that the general scheme will be changed to any extent. In its completed state, it is estimated that the plant will handle substantially 5,000,000 tons of ore a year, and produce annually, in round figures, 2,500,000 tons of steel. There will be 16 blast furnaces, of 450 tons daily capacity each, and 84 60-ton basic open-hearth furnaces. The finishing end will include slabbing, blooming and billet mills, a rail mill, of 900,000 tons annual capacity, one 48-inch and one 160-inch plate mill, with an estimated combined capacity of 300,000 tons a year, structural mills and 8-inch to 20-inch merchant mills. Neither of the latter has been designed as yet, and no data are at hand of the probable capacity of either on structural or merchant shapes, other than that a variable range of sizes will be rolled.

Chicago's Growing Importance.

But stripped of all the glamour surrounding an undertaking of such huge proportions, the most important feature of this plant, from a western standpoint, is that it is proposed to make it independent of all the established coke regions for its fuel supply. In this respect, it will be the only steel works so equipped in the Chicago district. The type of ovens to be used, and the number to be built, are still unsettled questions, and it is scarcely probable the company will reach them until after the completion of the work now under way. But in providing ample accommodations for a coking plant, of capacity large enough to supply the needs of the works, the company has decided the question of economy in such an installation as against the risks, inconveniences and expense of haulage from the established coke centers in Pennsylvania and West Virginia, and has added another link to the chain of events which is gradually bringing Chicago into rivalry with Pittsburg as an iron and steel producing center.

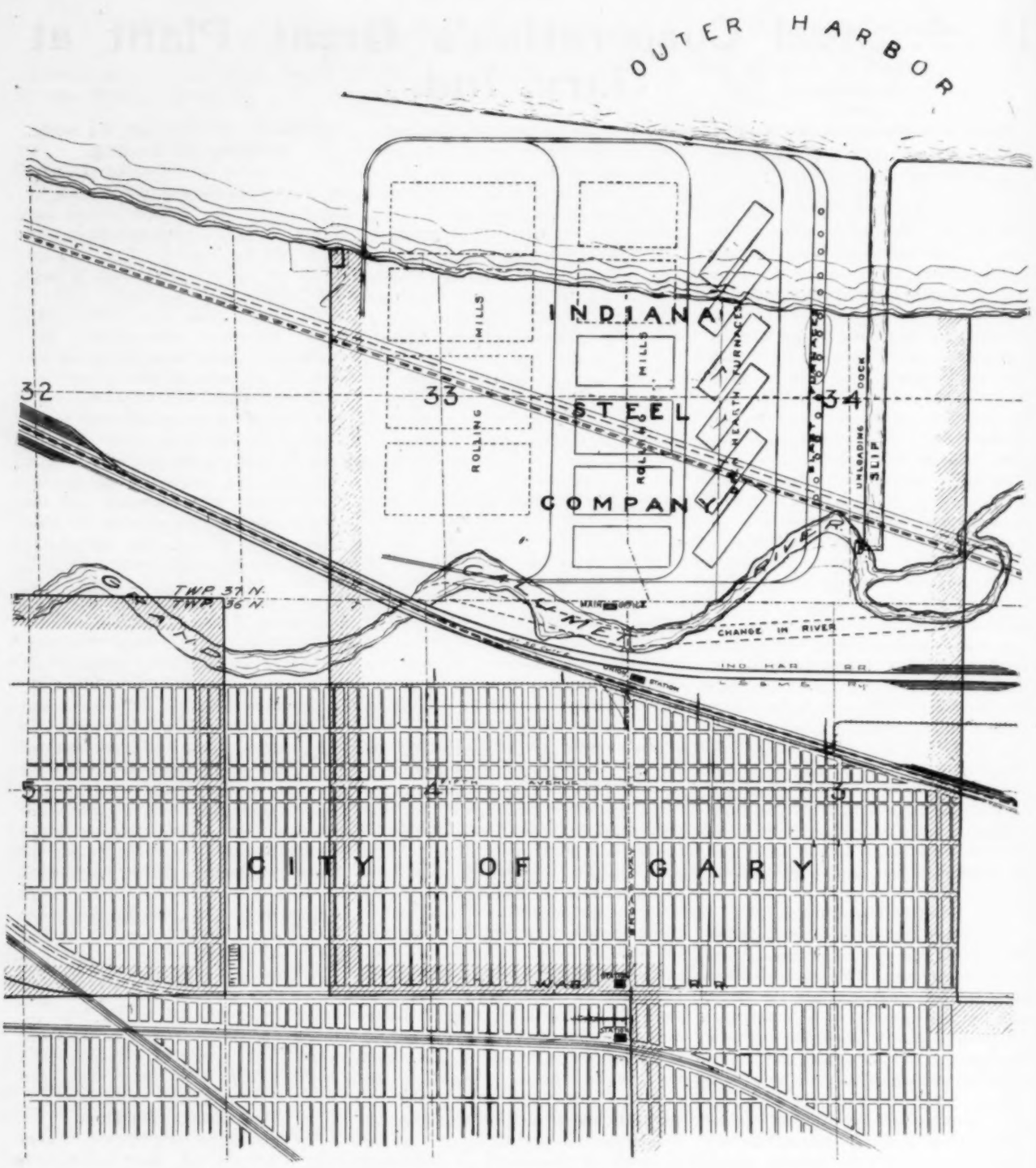
Upwards of $75,000,000, it is said, have been set aside by the Steel Corporation for the fulfillment of its plans at Gary; and it is the intention to embody in this enterprise all that modern science knows of the production of steel and in the building of a perfect American city, which will include libraries, theatres, parks, play-grounds and a social center. Practically all the machinery in the steel plant will be electrically driven, blast furnace gas being used to the largest extent possible for generating the current to drive the motors. Part of the undertaking involves the construction of an inner harbor and dock for the unloading of ore cargoes, as well as the changing of the course of the Grand Calumet river. The lake is very shallow at the point where the steel plant is to be located, navigable water being nearly 2,000 feet from the beach. From deep water in the lake to the site of the ore piles, a slip will be built 250 feet wide, 25 feet deep and one mile long. In changing the course of the river, only one object was desired, namely, to fill in the stream where it encroached on the steel plant. A new waterway, flowing directly east and west, will be excavated, and this afterwards will form the boundary between the town and the works.

Economy in Handling.

The plant has been designed to obtain the greatest economy in the handling of materials. At the extreme eastern end of the company's property, the coking plant will be located. The land on which the ovens will be built is 1,000 feet wide and one mile and a half long. The slip, ore yards, blast furnaces, open-hearth furnaces and finishing mills follow one another in the rotation named, an arrangement which will compel the location of all future extensions either to the west, or northward into the lake. As stated before, the plant will be built in units. The first unit, which will provide the company with one-quarter of the estimated total output, includes four blast furnaces and two of the open-hearth groups, comprising 28 furnaces, rail mill, machine shop, boiler shop, store house, foundry, pattern and carpenter shop. Necessarily the construction of the ore yard and slip goes with this work. The completion of the remaining furnaces and mills will be governed largely by trade conditions at the time. Fully 50,000 tons of structural shapes will be required in the erection of the buildings embraced in the first unit, from which may be obtained an idea of the enormous tonnage of steel that will ultimately be consumed here. The American Bridge Co. has the contracts for the frame work of the open-hearth buildings, the machine shop, store house, boiler shop, pattern and carpenter shop; and the Riter-Conley Co., of Pittsburg, has the contract for the shell work of the four furnaces. The blowing engines have not been ordered. Specifications for the rail mill are still uncompleted, but the American Bridge Co. will doubtless erect the frame work. The interior of the open-hearth plants will be built under the supervision of the company's engineers.

Open-Hearth Buildings.

The open-hearth buildings will be identical in every detail. Each will be 1,189 feet long, and 204 feet 5½ inches wide, and will contain 14 furnaces of 60 tons capacity each. The charging floors are 80 feet wide, and the pouring floors 61 feet wide. The latter wil have four pouring platforms. The charging floors will be served with 75-ton electric cranes, and the pouring floors with 125-ton cranes. The charging floors open into the storage yards, each 71 feet 9 inches wide. These run the entire length of the open-hearth buildings, each of which is served by a 5-ton crane. At the end of each



PLAN OF THE CITY OF GARY.

open-hearth group nearest the blast furnaces are the mixer buildings, having mixers of 300 tons capacity. These will be operated by hydraulic power. The frame work of each building will be 85 feet 6 inches wide and 120 feet long, and the ladles will be handled by 75-ton cranes having 15-ton auxiliaries.

The dimensions of the machine shop are 147 x 400 feet. The main bay will be 77 feet wide, with a clear height of 47 feet, 3 inches. The side bays are 35 feet wide each. A 25-ton crane, having a 75-foot span will be installed in the center bay. The blacksmith shop will be 62 x 100 feet, and the carpenter and pattern shop, 51 feet 3 inches by 100 feet. The latter will have two floors. The boiler house will be 130 x 160 feet with two lean-tos, 35 feet each. The clear height of the main bay of this building will be 42 feet 6 inches. The store house is 59 x 200 feet, and will also have two floors. Contractors are already engaged in clearing the land and putting in the foundations for all these buildings.

The Location of Gary.

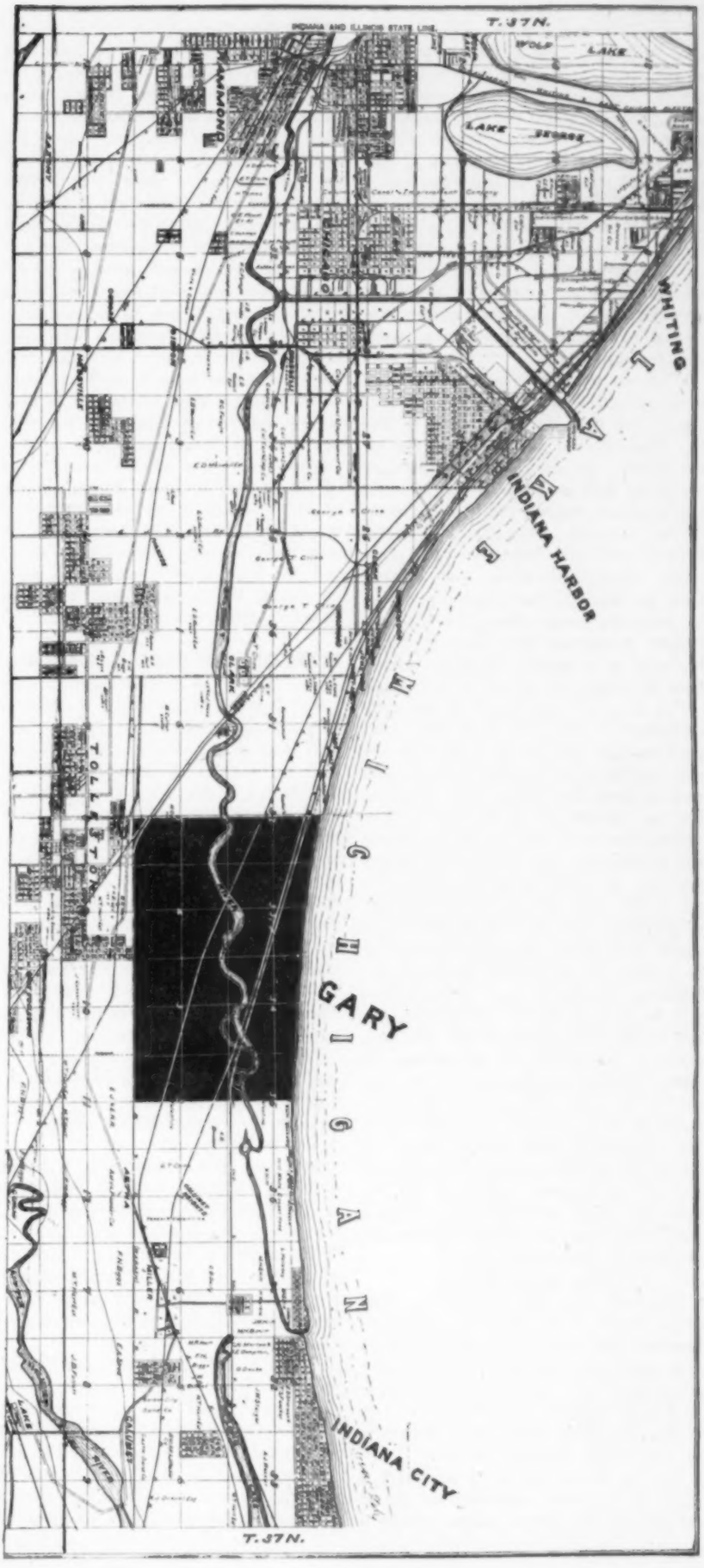
The tract upon which Gary is to be built has a mean altitude of 25 feet above the level of the Calumet river. It lies 10 miles east of Hammond and 26 miles southeast from Chicago, and is virtually a suburb of that city. Ample railroad connections are provided by the following trunk lines, all of which pass through it: Baltimore & Ohio, Lake

Shore & Michigan Southern, Wabash, Michigan Central and Pennsylvania. The following belt lines also tap the territory: Indiana Harbor, Chicago, Lake Shore & Eastern, Elgin, Joliet & Eastern, and Chicago Terminal Transfer. All the railroad tracks will be elevated through Gary, and the Pennsylvania through Tolleston. The Elgin, Joliet & Eastern, which is owned by the Steel Corporation, will have extensive yards just south of Clark Junction, with a capacity of 60,000 cars. In addition to the rights of way of the various railroads, the town will establish a permanent right of way due east and west and north and south, which, for a consideration, any road may use. The Chicago, Lake Shore & South Bend Interurban Electric Railway will use the principal right of way, running east and west along the north border of the town, while the Indiana, Logansport & Chicago Electric Railway, which is now under construction, will also pass through Gary.

The city will be about square, two miles each way, with ample room on three sides to expand. It has been laid out with the compass, and all streets will run due north and south or east and west. The main north and south thoroughfare will be called Broadway, and it will be 100 feet wide. The principal east and west street will be Fifth avenue, 80 feet wide. The intersection of these two streets will be the commercial center of the city, and a great public square will be located there. The finest business blocks will be built around it, together with municipal government buildings and other structures of a public character. Shade trees will be planted and lawns will be laid out around the entire square, and in the center it is planned to erect an ornamental band stand, where open air concerts will be given at frequent intervals. This will be the central recreation ground for citizens during summer evenings. Electric lights will supply illumination, and benches will be placed along the curb, where the people may sit and enjoy the music and rest. A system of small parks and play-grounds for children will be part of the general plans for open-air recreation grounds. Shade trees and lawns will be planted along the curb line in every street. Brick will be the paving material, and all sidewalks are to be concrete.

Features of the City's Plan.

The size of the lots for homes and business blocks has been established by the Gary Land Co. at 25 by 125 feet for the latter, and 30 by 125 feet for the former, except in two rows of blocks where the residence lots are to be 30 by 150 feet, on the theory that there will be a class of employes and business men who will want to build more pretentious homes requiring more ground. In the residence districts all alleys are to be 20



LOCATION OF GARY AND NEIGHBORING TOWNS.

feet wide, and in the business section the alleys will be 30 feet wide. This unusual alley width has much importance, for in the alleys, instead of in the streets, are to be laid all the service pipes and wires. Sewer, water and gas pipes, together with electric light, telephone and telegraph wires, are to be buried in the alleys, and all manholes and other openings, which are one of the nuisances in most city streets, will be in the alleys. The streets are to be entirely free from all obstructions of this character and in the future, no matter to what size Gary grows, there will arise no necessity for tearing up the street pavements to reach the conduits.

With the complete plan evolved, Gary is to be built from the center outward. Everything that has been done so far has been worked out with an eye to the future. At first, four main sewers are to be laid, of such size as to meet any increased demand that may be made by the expansion of the city. The lateral sewers are to be laid on the same principle. The waterworks and intakes from the lake will be of such capacity as to meet the requirements of a much greater population than Gary is likely to have in a decade. Certain restrictions will surround the sale of lots. These are of a general nature and are the only evidences of control which the Steel Corporation will seek to exercise over the city and its people. Lots will be sold ony to bona fide prospective residents, and the element of speculation in them will be eliminated entirely. The company will build houses for sale or rent, or will sell lots for building purposes. There are to be established four or five grades of buildings, and it is proposed not to permit a building of cheaper grade to be erected in a district set aside for buildings of a better class. No residences will be allowed in the business section, and no business houses in the residence section. There will be no attempt to control architectural designs. Every man may build as he chooses so long as his house is up to a general standard. It is not proposed to have any tenements or flats. There will be a wide range in the cost of the various dwellings, but the humblest cottage will have the same sanitary advantages and public conveniences as the more pretentious homes.

Policy as to Liquor.

The Steel Corporation will own none of the stores, banks or other public enterprises, but will insist that the men who apply for location for business purposes shall be of a class that will conduct their business in the proper way. A method will be found to exclude men of questionable business careers.

At first it was proposed to insert a clause in all deeds prohibiting the use of the ground for liquor selling purposes, but after mature consideration it was thought that this policy might prove disadvantageous, in view of the fact that a large percentage of the expected inhabitants are foreign born and are accustomed to drinks of an alcoholic nature. The question, however, is yet to be settled, and, merely as an experiment, three or four saloons under the most rigid restrictions will be opened. What the company most desires to produce is a modern city, free from the squalor and poverty of the average iron and steel town, conditions which are largely due to the existence of too many drinking places of a low order. A city is to be built that will invite the highly trained, intelligent class of workmen; a place where men of high or low degree may live, raise and educate their children, accumulate a competence and enjoy all the good things of life as they could in any city in the country. There is no philanthropy in this desire of the Steel Corporation. It is a plain business proposition with it, and one from which it expects to profit by making its employes happy and contented in their home surroundings.

MORTON MEMORIAL LABORATORY AT STEVENS.

The dedication exercises of the Morton Memorial Laboratory of Chemistry, at Stevens Institute of Technology, in Hoboken, June 13, were rather commemorative of the life and labors of the late Dr. Henry Morton to whom the institute owes so much, than the opening of a new laboratory, for the building dedicated had been in use for several months. Every speaker bore testimony to the genius, the noble character, and the unselfish efforts of Stevens' great president for the advancement of engineering education and in behalf of the students under his charge. The laboratory, which is unique in many ways and was declared practically perfect by Dr. Chas. F. Chandler, one of the world's foremost chemists, was in its essential features planned by Dr. Morton, and has been erected by the alumni as a tribute to his memory.

President Alex. C. Humphreys briefly reviewed the history of the movement which resulted in the erection of the laboratory at an expense of nearly $160,000 by the alumni of the institute. He spoke of the hopes and plans of Dr. Morton in regard to the building, and paid a touching personal tribute to the memory of his friend and predecessor.

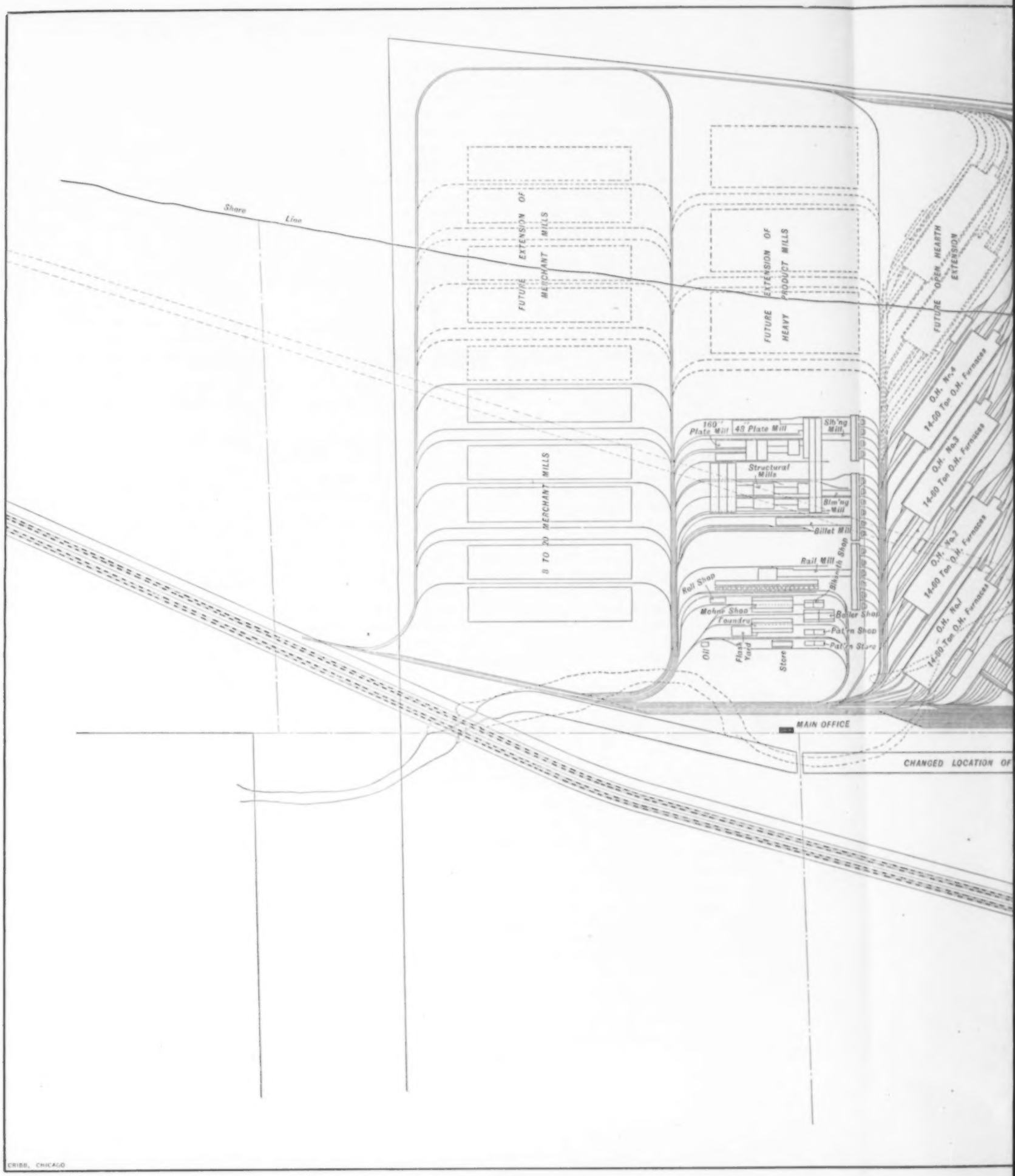
Alten S. Miller, of the class of '88, spoke of the many-sided character of the man whose name the laboratory bears. Not only was he great in many branches of natural science, but also in the arts and especially literature. He was an artist and a poet as well as an engineer. He quoted the late Prof. Thurston as saying that Dr. Morton's interests were so wide that no one man could possibly appreciate the value of his work in its entirety.

William A. Jenner, who as a specialist in patent law had frequently been associated with Dr. Morton in cases involving fine points of law, both natural and statutory, delivered a brief appreciation of his former colleague as an expert in legal controversy. His ability to grasp all the essential points of a subject and his lucidity of statement rendered his testimony at all times delightful and at the same time peculiarly convincing. He brought the imagination of an artist to bear upon abstruse and exact matters and could make clear to the eyes of the layman the most profound thought of the technical thinker.

Dr. Charles F. Chandler, professor of chemistry in Columbia university, had also been associated with Dr. Morton in patent law cases. He spoke of his kindliness and fairness as an adversary and his consumate skill in debate. He detailed more at length some of his contributions to science and described several wonderful pieces of apparatus designed by the president of Stevens and constructed in Stevens's shops.

After the dedication exercises, Prof. William H. Bristol affixed a bronze memorial tablet in the hall of the new chemical laboratory and the guests inspected the building. The laboratory is built for service. The architect has not been permitted to work his will with its design at the expense of utility. The system of ventilation planned by Dr. Morton is declared to be perfect and every pipe in the building is in plain view. The walls are of plain, undecorated brick in all the chemical work rooms and the most conspicuous object in the main lower hall is a line of sewer feed pipes, well below the ceiling, directly above one's head.

Mott Iron Works Removed.—At twelve o'clock, noon, on Saturday, June 9, the old J. L. Mott Iron Works at Mott Haven, N. Y., on the Harlem river, was formally closed and all its activities transfered to the new plant which has been in course of construction for many months near Trenton, N. J. Much of the machinery and also many of the employes had been removed before the final closing and the shift was so arranged that there was practically no loss of time. The plant on the Harlem was for more than fifty years one of the chief industries of upper New York, and was established by the father of the present Jordan L. Mott, under whose management it has grown to proportions too large for its original site. The firm name will probably always remain associated with the locality.



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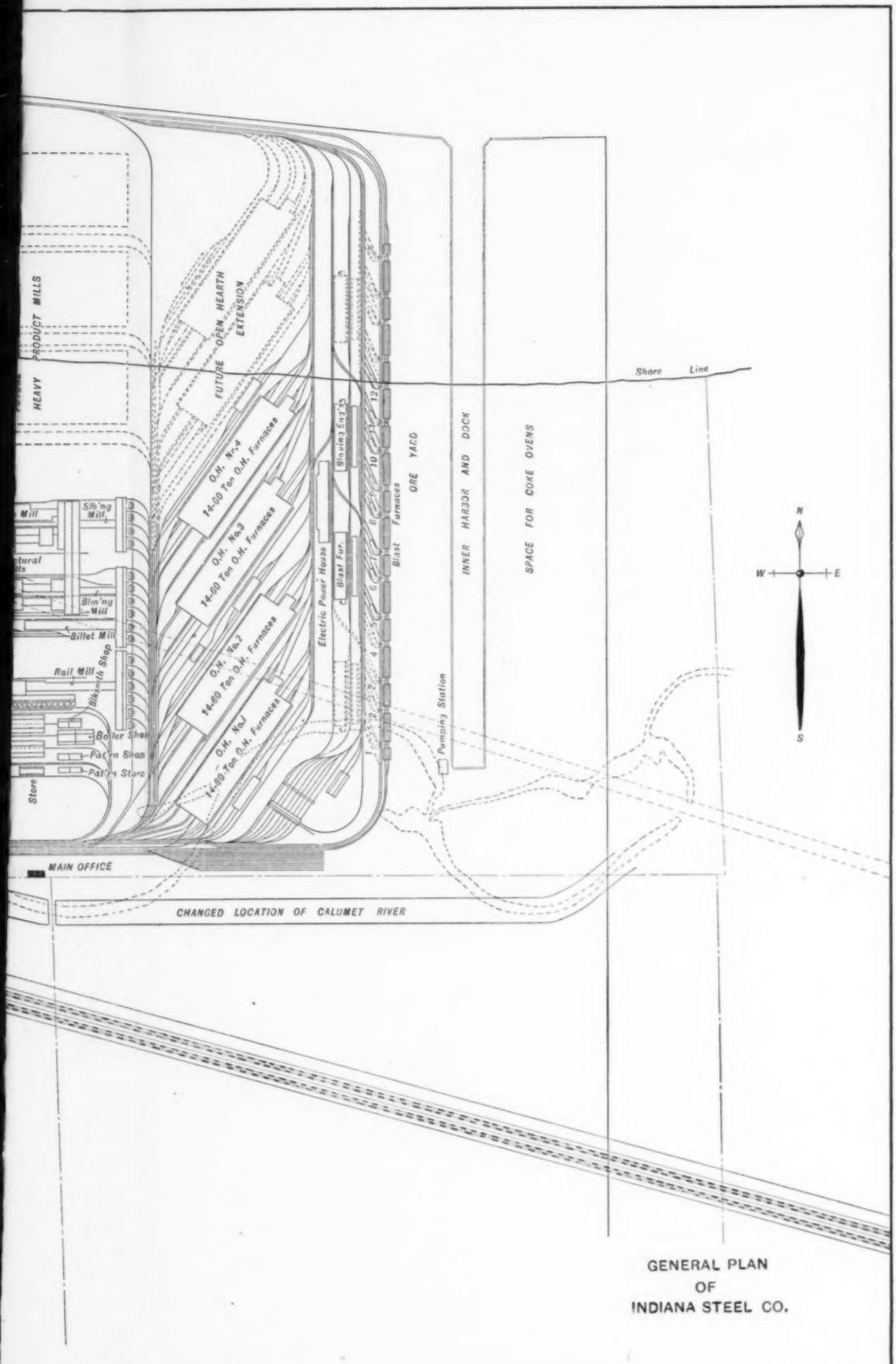


GENERAL PLAN
OF
INDIANA STEEL CO.

IMPROVEMENTS IN ROLLING IRON AND STEEL.[1]

BY JAMES E. YORK.

Forty years ago the bulk of the metal rolled was iron. Rolling iron was in some regards simpler, and in other regards, more difficult than rolling steel. Iron was adapted to quicker reduction, being softer, and capable of sustaining greater heat without injury. It was inherently weaker than steel at a rolling temperature, even when properly heated; but piles could be made, conforming to the finished section, which was a great advantage in making flange-sections.

Fig. 1 illustrates the rolling of a flat, 6 inches wide and ½ inch thick. This was undoubtedly the first rolling ever done in grooved rolls, and represents the simplest section that we have to make, and the only shape, rolled in closed grooves, to which the principle of uniform flow of metal from rolling-contact can be applied.

It is recognized that metal flows under pressure in the direction of least resistance, which, in rolling, is at right angles to the journal of the roll, or lengthwise of the bar. The result is to make the bar stronger longitudinally than transversely; and this is true of every bar (except rounds and squares), either of iron or steel, rolled in grooved rolls. In some cases, the difference amounts to from 10 to 15 per cent of the strength.

The most important physical effects are produced on the metal during the last stages of rolling. As the temperature decreases and the section becomes thinner, greater resistance is offered to reduction, and there is, consequently, a greater "fining" of the grain in steel or the fiber in iron. It is well known that in large ingots there is scarcely any "fining" of the grain by rolling, and that this effect is only reached when comparatively small dimensions have been attained.

The only important modern change in the process of rolling is the addition of a third roll, which doubles the capacity of the mill, and constitutes the "three-high system."

The billet or ingot, from which any flanged section is rolled in an ordinary mill, must have dimensions practically equaling or exceeding the extreme dimensions of the section to be produced, although the actual area of metal in this section will be much smaller than that of the original mass. Moreover, the first shaping-groove must be wider than the mass in order that the latter may enter it. It follows that the reduction of the metal by rolling-pressure is wholly in one direction; and this result is inseparable from the conditions presented by ordinary mills.

Fig. 2 shows the rolling "two-high" of an ordinary 6-inch beam. Modern mills are "three-high", but the same principle governs. This is one of the easiest flange-sections to roll, because it has an equal amount of metal on each side of the pitch-line, or center of the mill, and the flanges are of equal dimensions.

The difficulty encountered in rolling a section like this (and found to be still greater in sections of unsymmetrical form) is involved in the displacement of the metal, from a square or flat billet, to form a web. This displaced metal runs

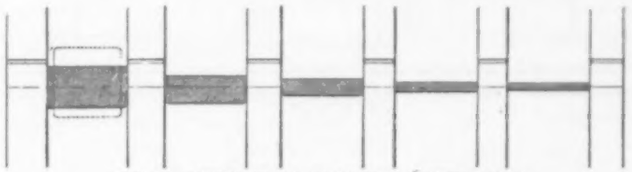


FIG. 1.—METHOD OF ROLLING A 6-INCH FLAT.

to length, and since there is no commensurate reduction of the flange-parts of the section, the metal of those parts is liable to crack, because it is not rolled, but stretched. After the blank in the first pass has been filled out, a more uniform reduction of the various parts can be provided for. The finished section shown in Fig. 2 has a flange 3.33 inches wide, with a web about 0.23 inch wide—the latter having received a transverse reduction about twelve times that of the cross-section of the flanges.

The rolling of flange-bars involves the thinning of the flange sideways by forcing into the groove metal much thicker than the recess provided. This is rather a wedging and drawing than a rolling action, and all such flanges are tapered, to permit their exit from the rolls. At the ends of finished bars of this character considerable waste is created by the different roll-dimensions, which prevent uniform surface-speed of the metal during the operation.

Another objection to this method of making flange-bars is that it is impossible to distribute the metal in scientific proportions. In most of the beams rolled today by the prevailing method, the web is thicker by at least 20 per cent than it need be, to harmonize with the other dimensions of the bar. The reason is, that the part of the roll which forms the web in Fig. 2 is 3 inches greater in diameter than the part which comes in contact with the widest part of the flange, and has at least 9 inches per revolution greater surface-travel than the part in contact with the end of the flange. The flange must, therefore, either slip or stretch to accommodate itself to the larger diameter. This causes the web to buckle or corrugate when rolled down to the proper thickness. These difficulties are greatly increased in rolling wider-flanged sections, whether large or small in other dimensions. In fact, it is almost impossible to produce, in an ordinary rolling mill, any shape with flange equal in width to the total height of the section. The effect of the difference in surface speed of rolling on various parts of rails, beams and other flange-sections, is, in the author's opinion, the cause of a large number of otherwise unaccountable fractures in service, due, probably, to permanent internal stresses rolled into the bar.

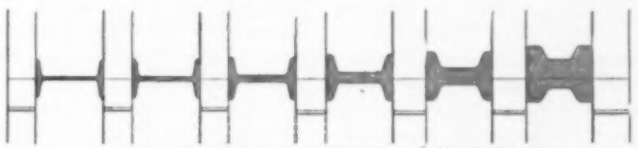


FIG. 2.—METHOD OF ROLLING A 6-INCH BEAM.

While the author was engaged in the manufacture of iron beams about thirty years ago, it was suggested that, if beams could be rolled with wider flanges, greater height and thinner webs, at least 20 per cent greater carrying strength could be secured for a given weight. This led to the design and building of what is now known as the York universal mill, for rolling sections with wide flanges and thin webs, or the usual sections when desired.

The front elevation and plan of this mill, which is a radical departure from the process of rolling as illustrated in Figs. 1 and 2, are shown in Fig. 3.

The advantages of this mill are: 1. It dispenses with grooves entirely and gets uniform sections without this provision. 2. It eliminates the wasteful and difficult method of displacing metal to form a web which is out of all proportion to other parts of the section. 3. No technical knowledge is required to design the rolls. 4. The operation is exceedingly simple, and the same rolls can produce a properly proportioned section weighing 50 or 150 pounds per foot. 5. By the old methods the web increases in the same proportion as the width of flanges, which is a great waste of metal. 6. This mill

[1]Abstract of a paper to be presented before the London (July, 1906) meeting of the American Institute of Mining Engineers.

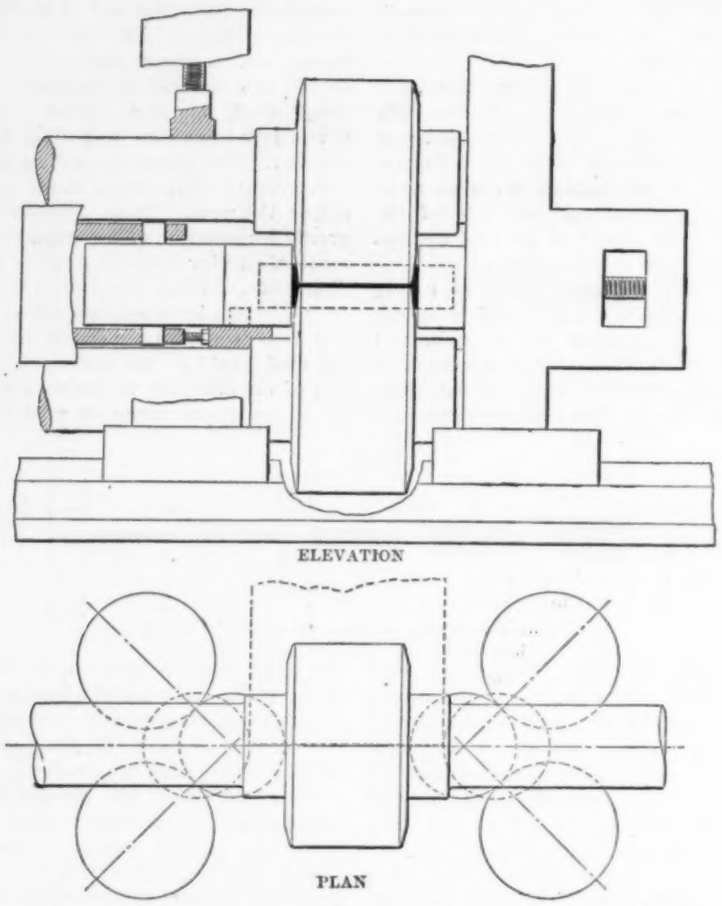


FIG. 3.—YORK UNIVERSAL MILL ARRANGED FOR ROLLING AN 18-INCH BEAM WITH 6-INCH FLANGES.

is adapted to roll either scrap or new steel to sections at least 50 per cent less in weight per linear foot than the common forms. 7. The beam produced by this mill has the same tensile strength transversely as in the longitudinal direction. 8. The rolls can be adjusted either at the commencement or during the operation, in order to have the web thinner and the flanges thicker, or the reverse. 9. This mill can roll a bar having one flange thicker than the other, since the dimensions of the flanges can be modified to suit requirements.

This mill consists of a pair of horizontal rolls positively driven, and a pair of vertical rolls run by the friction of contact against the bar. A line through the axis of these vertical rolls would intersect the center of the horizontal rolls.

The horizontal rolls work upon the sides of the web and shape the inner contour of the beam, while the vertical rolls shape the outer flange-surfaces. Both horizontal and vertical rolls are connected by a screw-device, so that the movement in all the rolls shall be simultaneous, an arrangement which secures the proper relative reduction of the flanges and web.

Fig. 3 represents the rolling of an 18-inch beam with 6-inch flanges. The slab, or ingot, for making this section is 29.5 inches wide and 6.25 inches thick. These dimensions give a reduction on each flange of 5⅞ inches sidewise and a reduction on the web of 5⅞ inches at the same time, which produces a beam 18 inches by ⅜ inch, having the usual taper to the flanges.

The rolls used in this mill weigh only one-quarter as much as those ordinarily used, and the power required is much less than that of the ordinary mill, for the reason that it is a rolling process, both horizontal and vertical, instead of a partly wedging and stretching action, as shown in Fig. 2.

The mill is adapted, without changing rolls, to make any reasonable weight of beam, having wide or narrow flanges up to the width of the face of the vertical rolls. It also rolls tees of different dimensions, having any length of leg, or flange, in the beam-rolls, the vertical rolls forming the flange. A beam-section cut longitudinally through the web forms two tees of half the height of the beam; hence a tee can be rolled on either side of the mill. Tee-sections, about the most difficult to roll in an ordinary mill, are very easily made by this process.

It was the intention, when building this mill on a commercial scale, to have a blooming-mill in which to roll an ingot down to about three inches thick in the web and a proportional thickness in the flanges; but, for unavoidable reasons, it became necessary to use the finishing-mill to do the entire reduction from the ingot or slab to the finished section. This action produced a slight defect in the finished product, the bars not being exactly parallel in the width of the flanges throughout the entire length. In order to overcome this difficulty, it was proposed to use a pair of supplementary rolls to work on the edges of the flanges, these rolls to be placed in line of the main rolls, and to be run at the same surface-speed of delivery as the rolls in the mill proper. These changes have since been installed, and beams of perfect section are now rolled.

Our experience with this process in rolling beams, having the width of the two flanges greater than the height of the

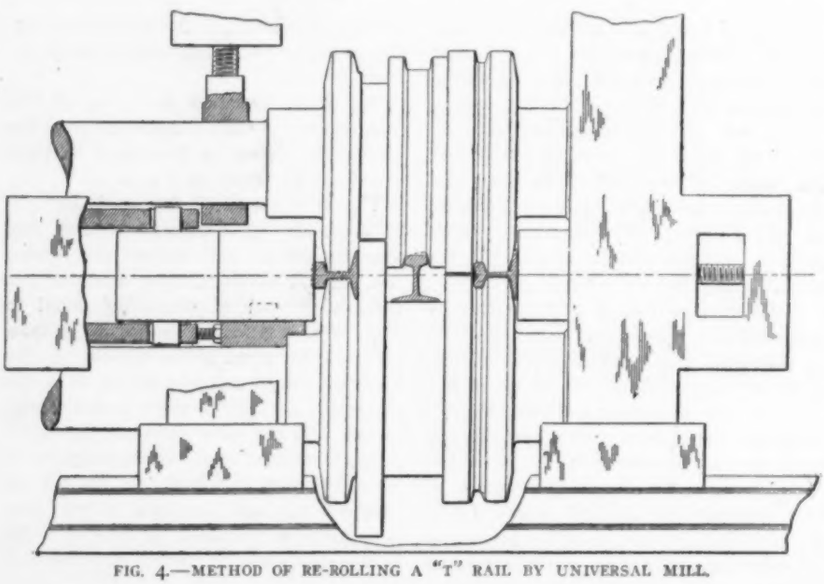


FIG. 4.—METHOD OF RE-ROLLING A "T" RAIL BY UNIVERSAL MILL.

web, showed that it was necessary to feed in the side rolls faster than the horizontal; otherwise, in rolling light webs with wide flanges, there would be a buckling action in the web, caused by the greater roll-surface contact on both sides of the flange. The mass being, of course, stiffer in the direction of the cross-section, the web was then held back to the average speed of the flanges, and caused it to corrugate.

The advantage of a light-web beam is illustrated as follows: The 18 by ⅜-inch beam, Fig. 3, weighs 42 pounds per foot, and the nearest comparable size of the ordinary beam is 15 by 0.41 inch, which also weighs 42 pounds per foot. The ordinary beam, however, has a load-carrying capacity of 18 per cent less than the light-web beam,—a difference which is larger in most of our sections, especially those made to take the place of built-up plate and angle-girders, having a much greater weight per foot. In addition to the gain in strength, the cost of building-up is reduced; this cost, in some cases, exceeds 40 per cent of the cost of our rolled beams. Sections having wide flanges, which equal the height of the section, are intended to take the place of "Z" bars and other columns. In this case, also, there is a great saving in weight and cost.

This mill has also been adapted to re-roll rails of various types for further service in the track, as shown in Figs. 4 and 5. It is admirable for this purpose from the fact that the rolls can be chilled, thus permitting the proper finishing temperature required to secure the best physical results. This mill can, also, upset metal from the web into the head and leave the flange the same width, and it can reroll any flange-bar or other sections in a longitudinal direction.

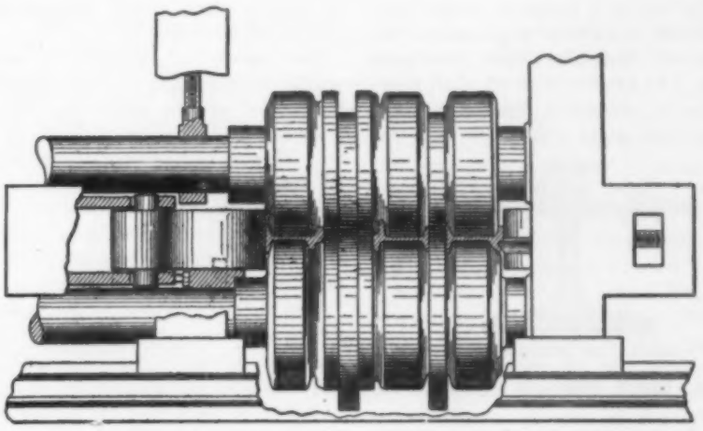


FIG. 5.—METHOD OF RE-ROLLING A GIRDER RAIL BY UNIVERSAL MILL.

Some years ago I took up the problem of making a steel tie, that would meet all railroad requirements, and, at the same time, be able to compete in cost with the wooden ties now in general use. To meet these conditions it was necessary to use worn scrap rails for the raw material, since it must be obtainable at a low price and in large quantities.

First, I designed sections for a steel tie, which railroad engineers said were ideal, provided it could be rolled. Then I designed a mill, shown in Fig. 6, to change the dimensions of the rail without lengthening it in the rolling. This mill can be driven like an ordinary two-high plate mill, or by disconnecting the top roll from the power, it may be run by frictional contact with the bar. The latter plan I consider to be the simplest and the best, for the reason that access to the mill can be had in all direc-

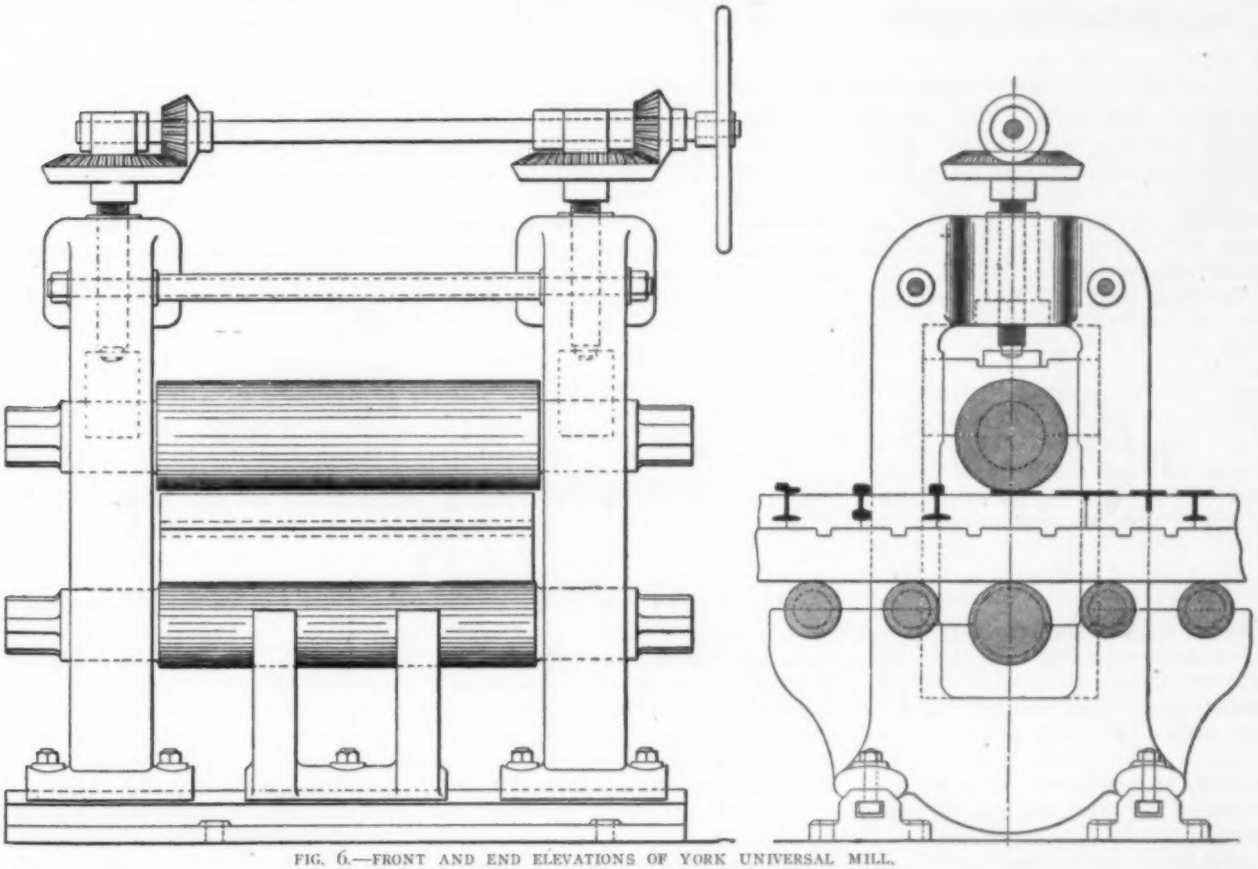


FIG. 6.—FRONT AND END ELEVATIONS OF YORK UNIVERSAL MILL.

tions by having a hydraulic motor connected with a rack in a pinion on the bottom roll. Both plans have given good results. The simplest method of all, however, is to connect a hydraulic motor between two mills, rolling in both directions, which naturally increases the output.

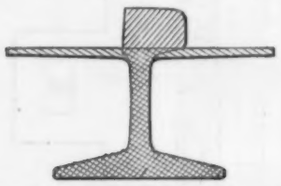


FIG. 7.—RESULT OF TRANSVERSE ROLLING.

By all other methods the greatest difficulty in longitudinal rolling is to produce sections having wide flanges; but in the York mill this kind of rolling is very simple. One part of the bar is rolled without disturbing the other dimensions. Rails that have been used on curves and have lost one-third of the metal on one side of the head can be rolled to form a section having the metal symmetrically distributed on both sides of the web, by using a rolling and bending action simultaneously in the mill.

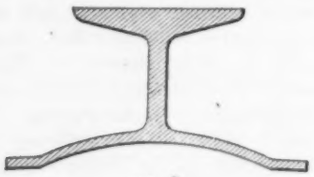


FIG. 8.

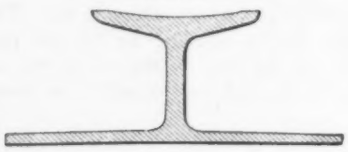


FIG. 9.

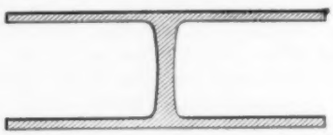


FIG. 10.

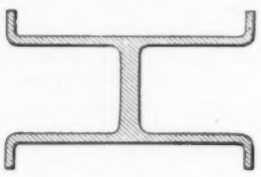


FIG. 11.

FIGS. 8-11.—SPECIAL SECTIONS ROLLED BY YORK TRANSVERSE MILL.

In rolling steel rails by the ordinary process, the web and bottom flange receive the most physical work in the mill, and are finished much colder than the comparatively large mass of metal in the head. The head therefore is the weakest part of the rail. In rerolling an old rail by the York process, the head receives the greatest amount of physical work, and the finishing passes can be made at a low heat, if desired, thus greatly improving the quality of the metal.

The capacity of the mill, in tonnage, would be regulated by the number of bars rolled at one operation. There is no difficulty in rolling at least six bars at a time, which gives a safe estimate of from 150 to 200 tons per day of rails weighing from 60 to 75 pounds per yard. During the rolling of any section in this mill, the flanges can be made thick or thin without any change of rolls.

This mill is confined to the transverse rolling of lengths not exceeding, say, 10 feet. If greater length is desired, a bloom (either of scrap rail or new steel) is rolled to proportionate dimensions of cross-section, and then rolled to length in the universal mill.

Fig. 8 shows a worn 70-pound T-rail rolled to a tie section with a curved base to give elasticity to the tie under moving load. Fig. 9 shows the section with a curved seat for the rail, so as to ensure the elasticity of the tie if the ballast in contact with the curved base should interfere with the elasticity of the lower flange. Fig. 10 shows a beam with flanges 9 inches wide and 3.25 inches in height of section, rolled from a 70-pound rail. Fig. 11 shows a section rolled with wide flanges, leaving the web without change of form. Fig. 12 shows a column section rolled from a 70-pound rail. Fig. 13 is an end elevation of the York mill, which shows the rolling of flanges on large and small ingots and flat slabs for blanks for the finishing mill. This arrangement dispenses with the unequal displacement of metal to form the web, and removes the greatest difficulty in the rolling of flange sections, and makes possible the production of sections from new steel that it is now impossible to produce by present methods.

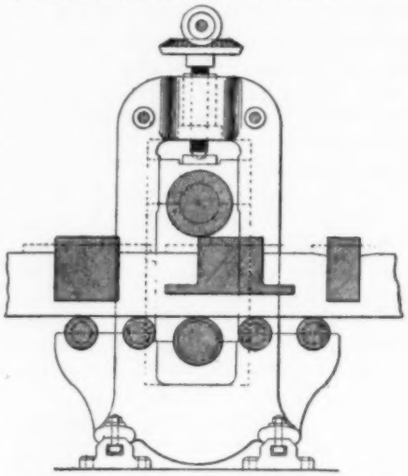


FIG. 13.—YORK TRANSVERSE MILL FOR ROLLING FLANGES ON INGOTS.

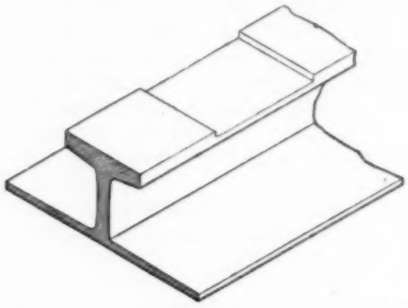


FIG. 14.—TIE WITH INDENTATION FOR RAIL, ROLLED IN YORK UNIVERSAL MILL.

Fig. 14 shows a tie with a recess rolled to form a rail seat so as to prevent track spreading. Fig. 15, column sections with rolled projections parallel to the length. These can be changed, if desired, into indentations of any other shape. Fig. 16 shows taper sections of narrow or great width; could be used for many purposes.

All the sections described above, with the exception of the ingots shown in Fig. 13, are designed to be made from old worn rail-sections. The girder and guard rails of electric and street car lines can be used to make the same class of material,

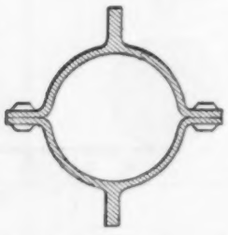


FIG. 12.—SPECIAL SECTION.

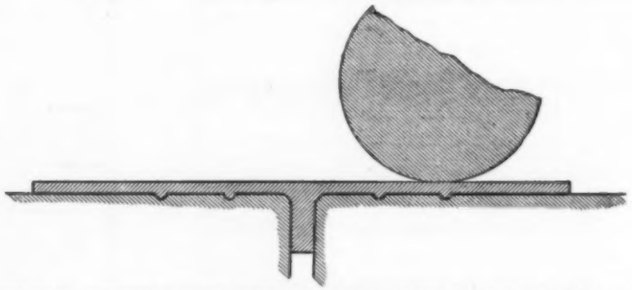


FIG. 15.—COLUMN SECTIONS WITH PROJECTIONS PARALLEL TO LENGTH, ROLLED BY YORK TRANSVERSE MILL.

and while the section would be of greater height, it is capable of being rolled with the same facility as worn tee or double-headed rails.

The method is not confined to the use of rail-sections alone as material for re-rolling. We take beams of all sizes, split the two flanges off, hot, in the machine, and use them for T-sections, column blanks and other purposes after rerolling. Angles, and, in fact, bars of any kind, are similarly available. The presence of holes in scrap material does not interfere with rolling by this method.

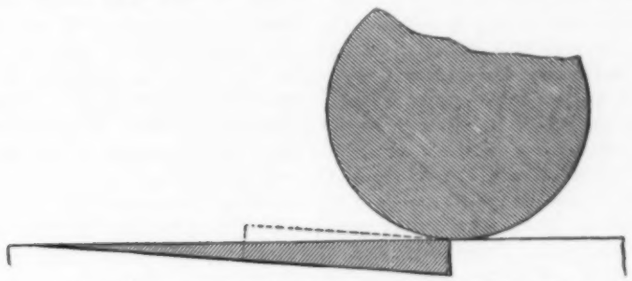


FIG. 16.—TAPER SECTION ROLLED BY TRANSVERSE MILL.

The process is adapted for flanging plates and sheets, hot or cold, and for making angles from flats; also for re-rolling plates and sheets with decorative designs on their faces, for artistic and industrial purposes.

IRON ORE IN NORWAY.

Large and valuable ore deposits have recently been discovered near Mosjoen, Norway. It is claimed the ore is the richest ever found in Norway, averaging sixty-five per cent metallic iron. The ore is of specular and magnetic variety, with a low percentage of phosphorus and sulphur, and tests have proven the perfect absence of titanium and chromium. The property is located within two miles of deep water, where large ships can load and carry the ore to English and German markets, which is a shorter distance to carry the ore, than from Duluth to Cleveland.

Four years ago the Dundeland Iron Ore Co. of London, England, commenced mining in this section of Norway under an extensive plan, has built railways and docks, and is shipping the ore to English ports; but its ore is not as rich in quality as that lately discovered.

Norway promises to become an important factor in the iron world, being so close to the English and German markets, and the late discoveries of large deposits of high grade ore, so close to shipping ports, will greatly reduce the cost of transportation. Several Milwaukeeans are interested in this iron property, H. E. Elden of Milwaukee, being a son of the principal owner, located at Mosjoen, Norway. New York and London capitalists are also interested in this property.

DULUTH IS BUSY.

Improved Condition at Docks.—Activities on the Ranges.

(Staff Correspondence.)

Duluth, June 16.

New transactions and items of especial interest have not appeared in affairs of the iron ranges this week, the atmosphere being uniformly quiet. This does not mean that the rush of the shipping season has in any degree fallen off, for on the contrary, Duluth is at present rather outstripping the neighboring ports in tonnage handled.

The effects of the strike tie-up are still felt in decreasing intensity in the congestion of boats at loading or unloading ports. At this writing there is a temporary shortage of boats at upper lake ports which in a measure delays the movement of cars on the docks. The fleet, however, is expected by tonight when some will be delayed in loading. The boats which are beginning to separate themselves from the wave of traffic are reaping the advantages of quick loading. On the whole the conditions of movement of ore, helped out by the fine weather of the past week and the considerable number of wild cargoes taken, are much improved. The railroads have contributed largely to this betterment, the corporation roads having received a considerable consignment of the new cars of their order for a thousand, though the other carrier into Duluth still suffers from a scarcity and has been compelled to use every available piece of rolling stock.

The new docks, Missabe No. 4 and Allouez No. 3, are moving but slowly toward completion because of inability to obtain the timber which is a particular Pacific coast timber. On the other hand, the Missabe docks, which ordinarily load a boat in 24 to 36 hours owing to the fact that usually the mixing of the ore which is done at the dock holds up a cargo, are now doing it in 12 hours.

On the Mesabi, the developments at Bovey and Colerain, where the largest interest is preparing to handle the lower grade ores by a washing process and is building a model town, are going on apace. The new branch of the Duluth, Missabe & Northern from Albora to Bovey is nearly completed, but will require a month before being opened to traffic.

Increased activity largely connected with the new findings on section 30 mark the work on the Vermillion range. West of the Mesabi in the neighborhood of Cass Lake, exploration work is being actively carried on following "floats" in a number of directions but no developments have come to light. Drilling is also being done near Tower on the north half of the southwest quarter and the northwest half of the southeast quarter of section 61-15 and the south half of the northwest quarter of the adjoining property, which land is held for the most part on a 25-cent royalty 50,000-ton lease. A tendency seems to have been developed, enhanced by the above operations, to revert to exploration work on the Vermillion. The discouraging feature is that while the ore is of the best quality in this region, the nature of its deposition makes exploratory work very expensive. A report not entirely substantiated is that the Great Northern will push its line, which extends eastward only to Virginia over toward Tower.

The departure of the Crescent City last Friday in tow of the Mariposa leaves only the Edenborn of the boats wrecked last fall. While it has not been definitely decided where the Crescent City will be repaired, it is probable she will be taken to the floating dry dock at Detroit. On Sunday night the Pierpont Morgan is expected at Two Harbors. A cargo close to 11,000 tons will probably be loaded with the record to Lake Erie ports in danger of being shattered. The water in Lake Superior, however, being almost a foot lower this year than last, may prohibit the breaking of any records.

The Shagawa Iron Co., operating on section 30, four miles east of Ely, has sunk a shaft to a level of 330 feet and has two drifts in high grade Bessemer ore at 270 and 325 feet. A persistent rumor has it that an ore body now being worked actively at a level of 1,300 feet in the old Minnesota mine at Soudan was unexpectedly run upon this month after driving the old shaft some 200 feet through jaspar in an attempt to find a continuation of the old deposit. This, however, is discredited by the corporation.

Ezra Rust of New York, and G. B. Goff of Saginaw, Mich., pioneers in the development of the Mesabi and interested jointly in the Rust and Cyprus mines as fee owners, are in Duluth on their annual visit to the ranges.

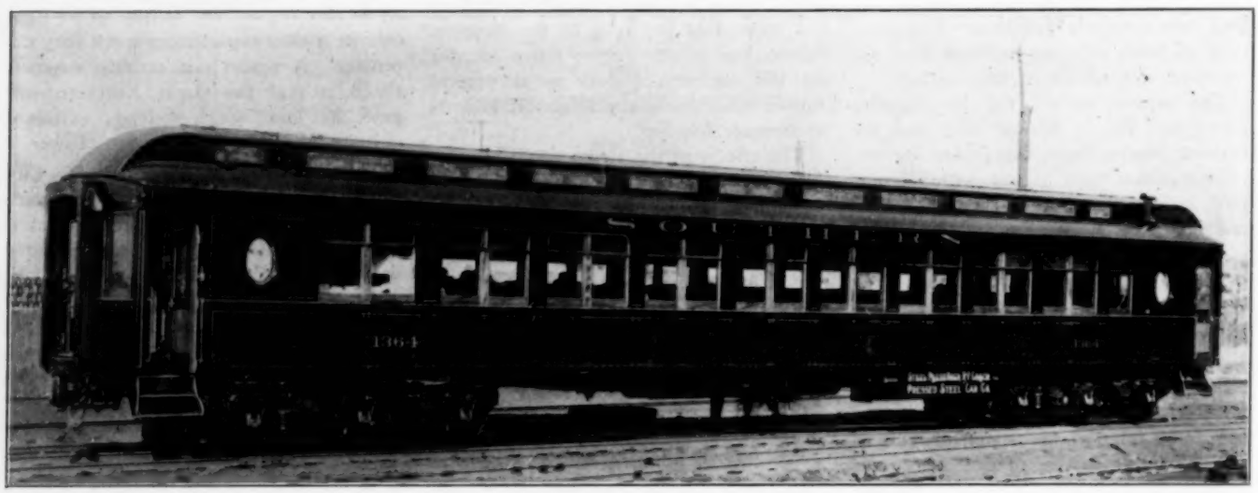
The local furnace is running up to capacity and the only feature in this section is the brisk demand for Bessemer. Simon Martin, superintendent of the Maryland Steel Co., was in Duluth on Saturday,

A PRESSED STEEL PASSENGER CAR.

In the accompanying illustration is shown one of the first of the three steel passenger cars built by the Pressed Steel Car Co., of Pittsburg, for the Southern Railway. This car was one of the notable exhibits at the annual convention of the Master Car Builders' Association at Atlantic City.

The Pressed Steel Car Co. has quite recently gone extensively into the construction of steel passenger cars. Last spring it delivered to the Metropolitan Street Railway, of New York, a steel street car which has been in constant service and has given great satisfaction. Within the past few days, a steel street car has been completed for San Francisco.

As the cars building for the Southern Railway represent entirely new departures in passenger car construction, and open practically a new field for finished steel consumption, a short description of the car placed on exhibition at Atlantic City, duplicates of which will soon be finished, will be of interest.



SOUTHERN RAILWAY'S NEW STEEL PASSENGER CAR.

The cars are of the same general size as the standard coaches of the Southern Railway. The interior arrangement of seats, smoking room and saloons and the general appearance of the car are the railway company's standard. In equipment, specialties, etc., the company's standard has also been followed wherever practicable to facilitate repairs and interchangeability. The general dimensions are as follows:

Length over platform	74 feet,	6¼ inches.
Length over body end sills	56 feet,	0 inches.
Total inside length	65 feet,	3¼ inches.
Distance from center to center of trucks	50 feet,	0 inches.
Width over side sheets	9 feet,	10¼ inches.
Width inside between finish.	8 feet,	10¼ inches.
Height from top of rail to top of body	14 feet,	2 inches.

The trucks are the railway company's six-wheel trucks. Steel construction has been used wherever practicable in place of wood. The underframe, superstructure, platforms, platform sills, body carlines and the side sheets of the cars on the outside below the windows are made of steel in the form of plates, pressed, rolled or built-up parts, according to the requirements and the adaptability of the material. The interior finish, doors, windows, window sash, upper part of floor, roof and the outside above the window sills, are of wood. The underframe is composed of two fish belly center sills built up of ⅜-inch plates, 22 inches deep at the center and 13⅛ inches over the bolster. These plates are reinforced with angle irons and cover plates and extend throughout the length of the car between the platform sills. The body bolsters, two in number, at each end of the car and spaced to suit six-wheel trucks, consist of 7-16-inch plates, 13⅛ inches deep near the center sills. These taper toward the sides and are reinforced with T-irons and cover plates on the top and bottom. The side bearings are supported on 8-inch I-beams, secured between the bolsters.

The underframe consists also of two deep and eight shallow diaphragms on each side of the car between the bolsters. The deep diaphragms are made up of ¼-inch plates, 20½ inches deep at the center sills and are reinforced with T-irons and cover plates on the top and bottom. The shallow diaphragms are made of 7-inch channels. The side plates below the windows are 3-16-inch cold rolled steel, reinforced with angle irons at the bottom edge and with a special shape at the top edge under the window sill. These reinforcing members extend the entire length of the car body.

The main post consists of two angles spaced apart, and the intermediate posts consist of one T-shape. The main post extends from the bottom of the side plate to the roof, but the intermediate posts extend from the roof to the window sill only, at which point they are riveted to a reinforcing plate extending between the main post inside and the side sheets.

The floor is composed of ⅛-inch steel plates, upon which are laid two courses of wooden flooring, each ¾-inch thick and ⅛-inch felt paper between. The top of the floor is covered with 3-16-inch lineoleum. The framing at the ends of the car consists of angles at the corners and of three channels reinforced with plates on each side of the door. The platforms are supported on the center sills and on 6-inch channels. The platform end sills are pressed from 5-16-inch plate into channel shape, in order to suit vestibule fixtures. All vertical lines of rivets on the outside of the car are covered with special drawn steel moldings, which give the appearance of broad panels, as used on some wooden cars.

The following specialties are used on these cars: Westinghouse high speed automatic air brakes and Lindstrom hand brake lever; Diamond special brake beams; Buhoup three stem couplers; Gold car heating system; McCord journal boxes; Pintsch system of gas lighting; Buhoup wide vestibule platforms with King automatic closers. The wheels are 36 inch, with steel tires.

The construction of these cars has been worked out by the Pressed Steel Car Co., subject to the approval of the important parts by the mechanical superintendent and consulting engineer of the Southern Railway. While the construction as a whole, as well as in details, may be changed in future similar cars, it shows decided improvement in the right direction, namely, a car offering greater resistance to damage in accidents, as well as minimizing the danger to passengers.

It is understood that the Pressed Steel Car Co. is now preparing drawings for still further advanced types of steel passenger coaches and steel trucks, these constructions to embody the use of non-inflammable or wholly fireproof materials.

Strike Settlement Terms in Two Large Districts.

The Cincinnati Agreement.

The Cincinnati agreement, entered into May 2 between the foundrymen of that district and the Iron Molders' Union provides as follows.

"Any dispute or difficulties arising between the parties hereto shall be referred to the representative or representatives of the firm and the union; their decision to be final.

"The minimum wages to be paid to floor molders shall be $3.20 per day of nine hours, to bench molders $3.00 per day of nine hours, and to coremakers $2.75 per day of nine hours.

"Overtime shall be paid for at the rate of time and one-half, overtime to begin at the expiration of the nine hours; except in case of accident to the cupola or machinery, when single time shall be paid.

"Double time shall be paid for Sundays and all legal holidays, to-wit: Fourth of July, Labor Day, Thanksgiving Day and Christmas.

"Molders and coremakers shall remain at work at the shop the full nine hours when requested to do so by the company or firm.

"All flasks in excess of 2,400 cubic inches shall be considered floor work, and any bench molder making such work shall receive floor molder's wages, whether he have one or more molds of this description.

"In computing apprentices, molders and coremakers should be counted together, ratio: one apprentice to eight molders and coremakers, and one apprentice for the shop; placed where desired by the company or firm.

"This agreement to be in force from May 7, 1906, to May 1, 1907, and to continue thereafter unless thirty days' notice is given by either party in writing, desiring a change in the above agreement."

This agreement was signed on behalf of the unions by Henry Hinnenkamp, and of the foundrymen by Charles Schreiber, D. P. Hopkins, H. H. Ukotter and Eugene Frintz, a committee representing the following concerns:

The Ballman & Wilson Fdy. Co.
John J. Bruce.
Chris Erhart.
The Globe Fdy.
The Insurance Stove & Range Fdy. Co.
The Mowry Car Wheel Co.
Queen City Fdy. Co.
L. Schreiber & Sons Co.
The U. S. Cast Iron Pipe & Fdy. Co.
The Dean Gas Engine & Fdy. Co.
The United Fdy. Co.
The Vulcan Fdy. Co.
The Weber Fdy. Co.
The Star Fdy. Co.
The J. Droege & Sons Co.
Houston, Stanwood & Gamble Co.
The Laidlaw-Dunn-Gordon Co.
The J. A. Oberhelman Fdy. Co.

Individual agreements were signed by the following Cincinnati foundrymen:

J. H. Day Co.
Bullock Electric Mfg. Co.
G. A. Gray & Co.
Blymyer Iron Works.
Eureka Fdy. Co.
Standard Pulley Co.

The nine-hour day was granted by the following non-union foundrymen:

I. & A. Greenwald Co.
John B. Morris Fdy. Co.

The New York Agreement.

The text of the agreement recently entered into between certain foundrymen in Greater New York, Jersey City and Hoboken on the one hand and the Iron Molders' Union on the other is as follows:

"AGREEMENT, signed this April 30, 1906, operative May 1, 1906, between certain foundrymen of Greater New York, Jersey City and Hoboken and the Iron Molders' Union of North America.

"FIRST: That the minimum wage rate paid molders shall be $3.25 per day and coremakers $3.00, wages paid above that rate to be maintained; that this wage shall continue in force until May 1, 1907.

"SECOND: That an old or infirm molder or coremaker not competent to perform the average day's work will be privileged to work for such rate of wages as can be agreed to between him and the foundrymen or his representative.

"THIRD: That an apprentice, after completing his apprenticeship of four years, shall receive for the next six months such wages as may be mutually agreed upon between him and his employer.

"FOURTH: That the Iron Molders' Union will not sanction nor permit any collective action to enforce a higher rate of wages than specified herein.

"FIFTH: That the employer when he uses molding machines, shall employ workmen other than molders to operate them, provided, he has notified the business agent of the Iron Molders' Union to supply him with molders and the business agent three days after such notice fails to supply him with molders who will produce the standard amount of work within a reasonable time.

"SIXTH: That when any foundryman has occasion to complain of a restriction of output, he shall report such restriction to the business agent of the Iron Molders' Union, who shall use his best efforts to correct such conditions.

"SEVENTH: That should any dispute arise between an employer and the molders or coremakers in his employment, which he and the business agent of the Iron Molders' Union cannot adjust, that such subject in dispute shall be submitted to arbitration and pending such arbitration there shall be no cessation of work.

"EIGHTH: That any foundry which runs overtime shall pay to its molders and coremakers time and a half, and double time for Sundays and legal holidays, said legal holidays being New Year's Day, Lincoln's Day, Washington's Birthday, Decoration Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas.

"NINTH: That this agreement shall continue in force from April 30, 1906, to May 1, 1907, and thereafter, unless sixty days' written notice be given by either party to the other party prior to May 1st in any year."

This agreement was signed by H. N. Covell of the Lidgerwood Mfg. Co., and J. F. Arnold, of the Snead Iron Works, representing the machine and jobbing founders of Greater New York, Jersey City and Hoboken, and by Bernard Kelly and Thomas B. Levey, representing the Iron Molders' Union of North America.

All of the foundrymen of this class in the district are parties to the agreement, including fifty-two members of the National Metal Trades Association. The following firms have signed the agreement:

Bell & Fyfe Foundry Co.
E. W. Bliss Co.
Brooklyn Foundry Co.
David W. Binne.
Cameron Steam Pump Co.
William M. Duffus.
Benjamin Fox.
Henry C. Fischer.
W. H. Holdsworth & Son.
Hecla Iron Works.
Lidgerwood Manufacturing Co.
C. A. Lefferts & Co.
McGee Foundry Co.
Richey, Browne & Donald.
Snead Iron Works.
Smith & Loughlin.
Steel & Condict.
John J. Riley.
Burr & Houston Co.
Simpson Foundry Co.
White Manufacturing Co.
Brooklyn Vault Light Co.
Metropolitan Iron Foundry.
John E. Daly & Co.

In the Toledo District.

Officials of the Toledo Founders' Association state that good progress is being made in the operation of struck plants. They have not so many skilled men as formerly, but are breaking in new men to take the places of those who went out. Three foundries gave in to the union on receipt of demands; the others have stood together during the six weeks of the strike and in another two or three weeks expect to have their full complement of men. Most of the foundrymen of the city are members of the Toledo Founders' Association.

Socialism in Milwaukee.

Members of the Milwaukee Metal Metal Trades and Founders' Association declare that they have every reason to feel satisfied with the present status of the molders' strike and the outlook for winning it.

The situation has remained practically unchanged since the first week of the strike. At that time the Hirsch Bros. Co., with three molders, the Greenslade Foundry Co., with approximately thirty molders; the Power & Mining Machinery Co., the Nordbert Steam Pump Co. and the Central Foundry Co., employing less than an average of fifty each, settled with the strikers. The plants in which the demands of the men were refused, and in which the open shop priciple is to be maintained hereafter, are those of the Falk Co., the B. Hoffman Manufacturing Co., the Filer & Stowell Co., the Allis-Chalmers Co., the Bucyrus Steam Shovel and Dredge Co., the Geo. H. Smith Steel Casting Co., the Pawling & Harnischfeger Co., the Prescott Steam Pump Co., the Vilter Manufacturing Co., the J. A. & P. E. Dutcher Co., the R. J. Schwab & Sons Co., the Sheriffs Manufacuring Co., the Milwaukee Steel Foundry Co., the Stowell Manufacturing Co., the Western Malleable and Grey Iron Co., the National Electric Co. and the Thomas Aston & Sons Co.

All of the 120 coremakers in one of the largest shops remained at work, and out of a total of 403 coremakers in the list last given, 248 remained at work. There were 1,368 molders employed in the struck plants, and of these 933 went on strike, 435 remaining at work. Since then the companies have put on about 300 handy men and a number of machines.

"The foundries today," says Secretary W. J. Fairbairn, "are running within about one-third of their normal output, with competent non-union help, and will hereafter maintain strictly open shops, free to all men. Only as individuals can the molders return to work."

The Milwaukee common council, which has twelve Socialist aldermen in its make-up, adopted the following resolutions on the strike, after a protest by three or four members:

Whereas, more than 1,200 molders residing in the city of Milwaukee were forced to lay down their work May 1, 1906, in order to secure a living wage; and

Whereas, About 100 men have been imported from all over the country by the Milwaukee members of the Foundrymen's association for the purpose of breaking said strike and to crush the Molders' union; and

Whereas, Said strikebreakers are a dangerous class of people and are likely to become a serious menace to the city if their numbers are increased,

Therefore be it resolved, That the common council of the city of Milwaukee hereby extends its sympathy to said striking molders and respectfully recommends that the Foundrymen's association grant their demands without unnecessary delay.

The resolutions were introduced by a Socialist. The city clerk mailed a copy to each member of the Foundrymen's Association and those represented in the Metal Trades and Founders' Association immediately replied with the following statement:

We understand that this resolution was passed in the belief that the strike was regarding wages. The question of wages is not involved in the issue. The employers have granted an increase of from 5 to 10 per cent in wages, which is more than the molders demanded. The demand was that nine hours should constitute a day's work, for an increase in pay, and for a closed shop. Only about one-third of the coremakers employed by us belonged to the union. The other two-thirds were men who had been in our shops a long time and would be either forced to join the union or cease work under such an arrangement. We considered it would be unjust to our coremakers to enter into such an agreement, and refused. The shops of the Milwaukee Metal Trades and Founders' association are open to every man, competent, who is seeking employment, regardless of his membership or non-membership in a union, and will remain so. Fair treatment and good wages will be accorded those employed by us.

Since the strike molding machines and improved appliances have been introduced into the foundry, and a large number of the residents of Milwaukee have been enabled to get employment at a higher rate of pay than had formerly been paid them. Men are being taken on daily, the foundrymen preferring to hire those who make Milwaukee their home. By this means the shops have been able to get out from 50 to 60 per cent of their usual work. Foundries of other cities, believing we are right, have agreed to make castings for us, large quantities of which are being daily shipped into the city. In this manner the local manufacturers are able to continue their business until such time as the new men are able to make the work at home. While there has been some slugging and a great deal of intimidation to prevent men from working, still we recognize the fact that the authorities have undertaken to maintain law and order and see that workingmen going to and from the shops are not molested.

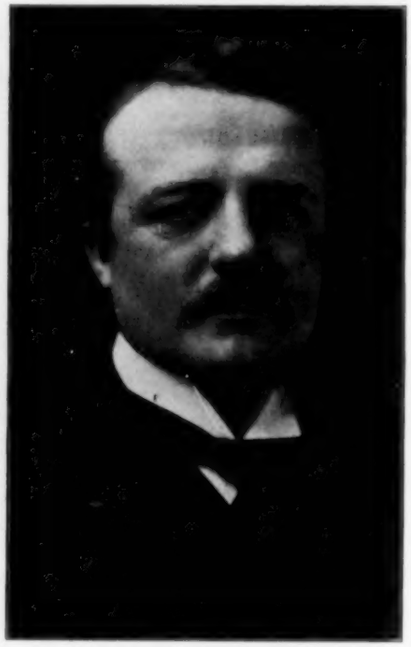
The action of the council in indorsing the molders without giving the foundrymen a hearing, or inquiring as to the facts, we consider decidedly unfair and un-American.

In addition the foundrymen point out that the men did not go on strike at the shops of the Chicago, Milwaukee and St. Paul road, the Northwestern Malleable Iron Works, the Wisconsin Malleable Iron Works, the West Allis Malleable and Chain Belt Co., the Speich Stove Repair Co., and the Crucible Steel Co. plants, which easily employ a total of 1,000 molders and coremakers. This, they say, indicates more clearly than any other thing the weakness of the union movement in Milwaukee among the molders.

"The employers," says Business Agent Schwab of the molders' union, "offered to raise wages, but they did not offer a shorter workday Neither did the molders include in their demands any provisions as to an open or closed shop. What they demanded was a 9-hour day with a minimum wage of $2.85 for coremakers, who have never had a minimum scale, and an increase of the minimum for molders of from $2.80 to $3.15 for bench molders and from $3 to $3.25 for floor molders.

CHRISTENSEN JOINS ALLIS-CHALMERS CO.

N. A. Christensen has joined the Allis-Chalmers Co., Milwaukee, as consulting engineer and will have charge of one of the company's shops which is now being fitted up with a mechanical plant of original design for the construction of the Christensen air brakes and compressors, the exclusive rights to manufacture and sell which have just been secured by that company. The Christensen air brake is



N. A. CHRISTENSEN.

especially suited for electric cars, and the large demand which is anticipated is evidenced by the fact that 800 or 900 additional mechanics will shortly be employed in its manufacture.

Neils A. Christensen was born 40 years ago in the Danish village of Copenhagen and early engaged in ship building and marine engineering, in which he won considerable prominence. He then went to England, shipped on an ocean liner as engineer to acquire the language, and returned to London to become connected with a large engineering company, for which he did noteworthy work in plant and machinery designing. In 1891 he came to New York in an effort to introduce a Corliss engine valve gear of his design. An electric railway accident resulting from defective brakes turned his attention to the possibilities in this direction and he developed the Christensen scheme of applying air brakes to electric cars. A few years later, the Christensen Engineering Co. was organized in Milwaukee, and Mr. Christensen was soon joined by Mr. F. C. Randall, now district manager of the Allis-Chalmers Co. at New York. A change in policy led to the retirement of Mr. Christensen, and the company's name was changed to the National Electric Co., which went into bankruptcy in 1905. It was sold to interests representing the Westinghouse Air Brake Co., and surrendered all rights to the Christensen patented devices. These have now been acquired by the Allis-Chalmers Co.

STRIKERS ENJOINED

From Interfering With Workmen at the Allis-Chalmers Plant.

Milwaukee, Wis., June 18, 1906.—One of the most sweeping injunctions since the celebrated Northern Pacific injunction issued by Judge Jenkins, of the federal court in Milwaukee, has been issued by Federal Judge J. V. Quarles, of Milwaukee, in connection with the strike of the molders at the plant of the Allis-Chalmers Co. The injunction prohibits the defendants from entering the grounds of the company or using threats or violence in an effort to induce other employes to quit work. Apprentices, especially, are referred to in this connection. The injunction prohibits picketing, provides against interference with employes going to and from work and prohibits the strikers from going to the homes of employes, or other places of their habitation, with the object of coercing or persuading them to quit work. It also prohibits the strikers from intimidating or fighting the relatives, wives or families of employes.

The Vilter Mfg. Co. has issued subpoenas for officers of the molders' union for an examination before a court commissioner, to ascertain the lines on which they are conducting the strike. Information is wanted on the following points: First, whether the defendants have combined to induce apprentices in the employ of the Vilter company to break their contracts with the company. Second, what acts of persuasion or intimidation have been used by members of the union to induce the apprentices to leave the employ of the company. Third, what combination or conspiracy has been entered into by the defendants to injure the business of the Vilter company and other foundries of Milwaukee by preventing them from operating unless with union molders and under conditions prescribed by the unions.

SOME IMPORTANT QUESTIONS IN ELECTRIC SMELTING SETTLED.

(Special Correspondence.)

Toronto, Can., June 16.—A preliminary report on the experiments made at Sault Ste. Marie, Ont., under the auspices of the Canadian government in the smelting of Canadian iron ores by the electro-thermic process, has just been issued by Dr. Eugene Haanel, Canadian superintendent of mines. The general results of the experiments were announced some time since, but many important details not previously published are given in the report.

It is explained that several important questions, having a vital bearing upon the feasibility of the electric smelting of Canadian ores as a commercial proposition, were not settled by the tests which the members of the Canadian commission, appointed to investigate the subject, witnessed at Livet, France. Briefly the important points referring to Canadian conditions which the experiments were made in order to determine were whether the process can be successfully applied to magnetite as well as hematite ore; whether iron ores with high sulphur content but not containing manganese can be made into pig iron of marketable composition; and whether the process can be so modified that charcoal, made chiefly from mill refuse and other wood useless for other purposes, can be substituted for coke as a reducing agent.

The furnace, specially designed for the tests by Dr. P. Heroult, the noted French expert, consisted of an iron casing made in two cylindrical sections and bolted to a bottom plate of cast iron 48 inches in diameter. Carbon paste was rammed into the lower part of the furnace up to the bottom of the crucible. The lining consisted of common fire brick, which from the bottom of the crucible up for a distance above the slag level, was covered with carbon paste to a thickness of a few inches. The electrodes, imported from Sweden, were prisms of square cross-section 16 x 16 inches by six feet in length. The contact with the cables carrying the electric current to the electrodes consisted of a steel shoe riveted to four copper plates which ended in a support for a pulley. The electrical energy was furnished by one phase of a 3-phase, 400-kilowatt, 30-cycle, 2,400-volt alternating current generator, belted to a 300-horsepower, 500-volt direct current motor. A current at 2,200 volts was delivered to an oil-cooled transformer of 225 kilowatts capacity, designed to furnish current to the furnace at 50 volts.

From the transformer, the current was conducted to the bottom plate contact of the furnace and to the electrode contact by conductors consisting each of 30 aluminum cables of 5/8-inch diameter. Preliminary experiments were required to adjust the capacity of the furnace crucible to the available energy and to determine the shape to be given to the interior of the furnace. An endeavor was also made to utilize the calorific energy of the carbon monoxide resulting from the reduction of the ore, which in previous experiments had been wasted. It was found, however, that the construction of the furnace would not permit of this, and so the attempt was discontinued. With a differently constructed furnace this object it is believed, can be accomplished.

The official experiments, begun about the middle of January and continued with few intermissions until March 5, involved the treatment of eight classes of ore, five of them magnetite, one hematite, one titaniferous iron ore, and one washed pyrrhotite. The materials, consisting of ore, flux and carbon, were crushed to pass through a 3/4-inch ring and roughly mixed. In all about 150 casts were made, yielding about 55 tons of pig iron.

Dr. Haanel anticipated some difficulty in the smelting of magnetite on account of its conductivity, but it was found that with charcoal as a reducing agent no such difficulty was experienced. As to the substitution of charcoal for coal-coke, the experiments were also completely successful. Charcoal when crushed to pass a 3/4-inch ring was found so admirably adapted as a reducing agent that coke and briquettes of coke with clay were abandoned, and the experiments with magnetite and washed pyrrhotite described were made with charcoal, though some of that employed was of a poor quality. A considerable quantity also was consumed on the top of the furnace, owing to a defect in construction which the report states must be modified for commercial operations. For the production of 42,711 pounds of pig iron, 384 pounds of electrodes were consumed or 17.98 pounds of electrode per ton. The power factor of the furnace was determined by Charles Darrall, of the Canadian Westinghouse Co., of Hamilton, Ont., and was found to be 0.919.

Probably the largest unit which can at present be constructed on the model of the experimental furnace will not exceed 1,500 horsepower. Modifications in the design are suggested to permit of the use of labor-saving machinery for charging; for the collection and utilization of the carbon monoxide; and for the protection of the charcoal from combustion on the top of the furnace. The greater capacity insuring less loss of heat by radiation, combined with the saving of the carbon monoxide, will increase the output beyond that ascertained by the experimental furnace. The experiments indicated that under normal conditions about 11.5 tons were produced by an expenditure of 1,000 electrical horsepower, and the report therefore considers it resonable to assume that with a properly constructed plant the output for such an expenditure of energy would reach at least 12 tons, and this figure has been adopted in calculating cost of production. By reason of the value of the product the smelting of washed nickeliferous pyrrhotite as carried on with the experimental plant admits of immediate commercial application, without other modification of the furnace than an increase of capacity.

The cost of production per ton of pig iron is given as $10.69, the various items being as follows:

Ore (55 per cent) at $1.50 per ton	$ 2.70
Charcoal at $6.00 per ton	3.00
Electric energy, amortization, etc.	2.43
Labor	1.00
Limestone	.20
Electrode, 18 pounds at 2 cents	.36
General expenses	1.00
Total	$10.69

The estimated cost of a 10,000-horsepower plant producing 120 tons of pig iron per day of 24 hours is $700,000, which would result in amortization, depreciation and interest charges of 15 per cent per year, making $105,000. This on a production of 43,200 tons per year of 360 days would make the cost per ton under this head $2.43.

The report concludes with a summary of the practical results obtained by the experiments as follows: Magnetite can be as economically smelted by the process as hematite. Ores of high sulphur content free from manganese can be made into pig iron containing only a few thousandths of one per cent of sulphur. The silicon content can be varied as required for the class of pig produced. Charcoal can be substituted for coke as a reducing agent without being briquetted with the ore. Ferro-nickel pig practically free from sulphur can be produced from roasted pyrrhotite. The experiment with titaniferous ore containing 17.82 per cent of titanic acid, permits the conclusion that titaniferous ore up to perhaps five per cent titanic acid can be successfully treated.

MAKING PIG IRON.

Decreased Cost Due to Labor Saving Machinery.

The Bureau of the Census has just made public some interesting and valuable details concerning the manufacture of pig iron in the United States in the calendar year 1904.

The details published by the bureau show that, while the number of establishments engaged in the manufacture of pig iron fell from 223 in 1900 to 190 in 1904, a decrease of 33, the capital invested in the industry increased from $143,159,233 in 1900 to $236,145,529 in 1904, an increase of $92,986,296, or 65 per cent. Salaried officials, which include superintendents, foremen, clerks, etc., as well as the officers of corporations, numbered 2,231 in 1904, as compared with 1,757 in 1900, an increase of 474, and the wages received by this class of officials amounted to $2,890,897 in 1904, as compared with $2,304,120 in 1900, an increase of $586,777, or 25.5 per cent. In 1904, the average annual salary paid each official was $1,295 and in 1900, it was $1,311, a decrease of $16 per official.

While in 1900, the average number of wage earners employed was 39,241 in 1904 the average number had fallen to 35,077, a decrease of 4,164. The wages paid these employes amounted to $18,484,400 in 1900 and to $18,934,513 in 1904. The average annual earnings of wage earners in 1900 was $471, but in 1904 their average annual earnings amounted to almost $540, an increase per wage earner of about $69.

The total cost of all materials used amounted in 1904 to $178,941,918, as compared with $131,503,655 in 1900, an increase of $47,438,263, and the total value at furnaces of the pig iron made, including spiegeleisen and ferromanganese, amounted to $228,911,116 in 1904, as compared with $206,512,755 in 1900, an increase of $22,398,361. In addition products other than pig iron amounting in value to $2,911,591 in 1904 and to $243,802 in 1900 were made. The pig iron produced in 1904 amounted to 16,623,625 gross tons, as compared with 14,447,791 tons in 1900, an increase of 2,175,834 tons, or 15.1 per cent. In the manufacture of this pig iron there were consumed in 1904 about 29,203,944 tons of domestic iron ore, valued at $96,206,246, or $3.29 per ton, as compared with 24,612,511 tons consumed in 1900, valued at $61,795,473, or $2.51 per ton. In addition 829,918 tons of foreign iron ore, valued at $4,739,123, or $5.71 per ton, were consumed in 1904, as compared with 754,383 tons of foreign ore, valued at $4,107,449, or $5.44 per ton, consumed in 1900. The average value at furnace of the pig iron made in 1904 amounted to $13.77 per ton, as compared with $14.29 per ton in 1900.

The number of furnaces in blast either for long or short periods in 1904 was 324, against 325 in 1900. The daily capacity of the furnaces was 77,970 tons in 1904, as compared with 54,425 tons in 1900, an increase of 23,545 tons, or 43.3 per cent.

Summarizing the details given by the Bureau of the Census the following results are shown for the two years:

Expenditures.	1904.	1900.
Salaries of officials, etc.,	$2,890,897	$2,304,120
Wages	18,934,513	18,484,400
Miscellaneous expenses	9,788,139	7,463,234
Iron ore, fuel, etc.	178,941,918	131,503,655
Total expenditures	$210,555,467	$159,755,409

Deducting these expenses from the value of the pig iron made and the amount received from the sale of other products we have the following results:

Receipts.	1904.	1900.
Pig iron	$228,911,116	$206,512,755
All other products	2,911,591	243,802
Total	$231,822,707	$206,756,557
Deduct expenditures	210,555,467	159,755,409
Approximate gain	$21,267,240	$47,001,148

In the above calculation no allowance has been made for depreciation of plant, for the erection of new buildings, for the installation of new machinery, or for other similar expenses, as the Census Bureau takes the stand that improvements of this character add to the value of a plant and are fully covered by the interrogatories relating to capital invested.

Omitting all extraordinary expenses of this kind, but including all expenses for repairs to machinery, furnaces, stoves, hoists, pig iron casting machinery, etc., the pig iron makers earned approximately a little over nine per cent in 1904 on the capital investment, as compared with almost 33 per cent in 1900. On the actual business transacted the approximate gain in 1904 was also only a little over nine per cent, as compared with almost 23 per cent in 1900. The showing for 1904 is not at all encouraging and not what those familiar with the pig iron industry looked for. A gain of only a little over nine per cent on the capital invested and on the business transacted in 1904, even though 1904 was a year of reaction and low prices in the iron trade, is not only surprising but disappointing. Consolation is found in the fact, however, that in 1905 our pig iron makers had a much more prosperous year and were able at the close of December to present to their stockholders a much better financial showing than was reported to the Bureau of the Census for the year 1904.

The remarkably large increase in capital invested in 1904 as compared with 1900—from $143,159,232 in the latter year to $236,145,529 in the former year, or about 65 per cent—will repay close inspection later on when the details for states for the pig iron industry are published by the Census Bureau. According to the census statement the active blast furnace establishments had 343 completed furnaces in 1900 and 344 completed furnaces in 1904. During the intervening period, of course, a number of old furnaces were abandoned and dismantled and a number of new furnaces were built and put in operation, some by entirely new organizations and some by companies which were in operation in the census year 1900. Many furnaces which were in existence in 1900 were also rebuilt and modernized. All these additions to our blast furnace capacity largely increased the capital invested in the pig iron industry. But an increase in capital invested of almost $93,000,000 in a little over four years when compared with an increase of less than $14,000,000 in the ten years from 1890 to 1900 is almost beyond belief, especially when it is remembered that the increase in pig iron output from 1900 to 1904 amounted to only 2,175,834 tons, while from 1890 to 1900 the increase was 5,607,049 tons. Of course, capital invested by blast furnace companies in iron ore lands, coal lands, coke ovens, etc., etc., cannot properly be credited to the blast furnace industry, as the Census Bureau also collects for all these industries details similar in many respects to those just published for the pig iron industry. It is therefore necessary to credit these industries with the capital invested in their operation; otherwise duplications in capital invested of hundreds of millions of dollars would result. Doubtless the Census Bureau has ample authority for the figures it gives for capital invested in the blast furnace industry in 1904, but when the statistics by states appear, it will be very interesting to ascertain in what states the enormous increase in capital from 1900 to 1904 has been invested.

The direct blast furnace labor cost in the production of a ton of pig iron in 1904 was a fraction less than $1.14, as compared with a fraction less than $1.28 in 1900. In this calculation the salaries drawn by officers, clerks, etc., are not included. Including employes of this character the total labor cost per ton of the pig iron made in 1904

was a little over $1.31, as compared with almost $1.44 per ton in 1900. It will thus be seen that, notwithstanding a decrease of 4,164 in the average number of wage earners employed in 1904 as compared with 1900, and an increase of about $69 each in the earnings of these wage earners, the labor cost per ton of pig iron was about 14 cents less in 1904 than in 1900. If the officers and clerical help are included the cost per ton was about 13 cents less in 1904 than in 1900. The increasing use of labor-saving devices is plainly shown in the above figures. But the use of appliances of this character has not resulted in decreased earnings to blast furnace employes, but has had directly the opposite effect, wage earners about blast furnaces earning about 13 per cent more wages in 1904 than they did in 1900.

The average output of pig iron per wage earner shows a large increase in 1904 as compared with 1900. In the former year the 35,077 wage earners reported made 16,623,625 gross tons of pig iron, or an average of almost 474 tons per wage earner, while in 1900 the 39,241 wage earners then employed made 14,447,791 tons, or an average of a fraction over 368 tons per wage earner. This is an increase of 106 tons in 1904 over 1900, or over 28 per cent, in a little less than five years. The ever increasing use of pig iron casting machines and the tendency to use molten pig iron direct from the furnaces by all the large steel plants is plainly indicated. During 1904 probably one-fourth of the pig iron made was machine cast and at least one-third was delivered to Bessemer converters and open-hearth furnaces in a molten condition.

INDIANA ORE DISCOVERIES.

Reports of the recent discovery near Petersburg, Ind., of a rich deposit of iron ore prove to have been exaggerations. While no extensive examination of this field has been made, samples of its ore have been submitted to W. S. Blatchley, state geologist, who has found that it is only limonite or brown hematite, running about 40 per cent iron. It is of the same character of ore as was described by Mr. Blatchley in THE IRON TRADE REVIEW of Nov. 20, 1902, as occurring in Greene and Martin counties, Ind. These deposits have been known and operated for fully 60 years. In 1870 there were 15 blast furnaces operating in the state, but they were gradually forced to close down as the native ore on which they ran could not compete with the richer ores of Lake Superior.

STEEL CASTING PLANT

And Other Works Planned or Being Erected in the South.

(Special Correspondence.)

Birmingham, Ala., June 11., 1906.—The last month of J. A. Durfee with the Tennessee Coal, Iron & Railroad Co., as general superintendent of the Ensley division, in charge of the blast furnaces and steel plant, was a most successful one. As stated before, Mr. Durfee goes back to the Colorado Fuel & Iron Co. The output at the Ensley steel plant has been increasing steadily from month to month until last month it is announced the production went over 24,000 tons of ingots. The rail production was correspondingly heavy.

While no definite announcements are made, rumors prevail that the Tennessee Coal, Iron & Railroad Co. is to make some extensive improvements betwen Ensley and Wylam, in the western part of Jefferson county and about seven miles from Birmingham. The erection of another steel mill would not be surprising, inasmuch as the site laid off is sufficient for such an industry. Officials of the company are silent as to the purpose of preparing a site.

T. E. E. Bartlett and David Blake have gone to New York and Pittsburg for the purpose of buying equipment for a large steel casting plant which they will erect in East Birmingham. The new industry will represent an investment of $125,000. It is given out that the company to be formed by the two gentlemen named will absorb the Bartlett-Tewksbury Machinery Mfg. Co., whose plant is located in East Birmingham.

An indication that a radiator manufacturing plant is to be located in this district in the near future is given in announcements that the various railroads in the Birmingham district have made a special freight rate on such articles. The statement was made some weeks since that representatives of the American Radiator Co. were making investigations for a site on which to erect a large radiator plant in this section.

Fire two weeks ago destroyed the stock house, bins and boiler sheds at the city furnace plant of the Sloss-Sheffield Steel & Iron Co., and caused one furnace to be shut down for three days and delayed the blowing in of No. 2 furnace which has been undergoing repairs for some time. The Sloss-Sheffield company is putting up a more commodious stock house than ever before.

The Weller rolling mills are to be removed from Anniston to Gadsden, Ala. The board of trade of Gadsden is said to have made efforts which landed the concern. Gadsden has very bright prospects. In addition to a large steel plant and a large sized blast furnace constructed by the Alabama Steel & Wire Co., (now the Southern Steel Co.), a soil pipe plant, and other small industries have been located in the last five years and much other work is under way. The Southern Steel Co. will spend something like $2,000,000 in that vicinity in the next three years, erecting among other things an immense structural steel and iron plant. Plenty of water and other necessities in the manufacture of iron and steel and other heavy articles are to be found in and around Gadsden.

The big cast iron pipe plant in Sheffield is nearing completion and will be ready for operation shortly.

FINE BODY OF ORE

Has Been Found in Western Mesabi—Other Discoveries.

(Special Correspondence.)

Aurora, Minn., June 15.—News of another important mineral strike comes from the western Mesabi country. Drills operated by the Longyear Exploration Co., under contract with the steel corporation, are reported to have located a fine body of ore on the northwest quarter of the northwest quarter section 2, 55-25. The mineral was encountered after 137 feet of taconite had been penetrated, and, at a depth of over 400 feet, according to most recent advices, the drill was still in ore. The tract is owned in fee by the Vermilion Range Land Co., and adjoins the Lind-Buckman "forty," also held by the steel corporation.

The existence of iron ore at the confluence of the Prairie river with the Mississippi has been known for years, but as the district has never been properly explored, the extent of the deposits or the quality of their content has not yet been ascertained. Now, it is stated, the Fayal Iron Mining Co. of Eveleth, subsidiary to the steel corporation, has secured options on a large acreage of land in the field and extensive exploratory work will soon be undertaken. The location is about four miles east of Grand Rapids. In the Canisteo field, in the vicinity of Bovey, the steel corporation is preparing for the erection of locomotive and steam shovel sheds. The main building will be 137 by 41 feet in ground dimensions. A laboratory building is another structure that is to go up shortly.

The Cleveland Cliffs Iron Co., which owns considerable land in the vicinity

of the platted town of Snowball, about twenty miles west of Hibbing, is understood to be contemplating the early development of its ore bodies there. Besides this company's holdings there are other tracts in the district on which ore has been found, and now that the Missabe road's western Mesabi extension, which passes through Snowball, is about to be opened for traffic, it is expected that the opening of the field will be a matter of comparatively short time. In the Mountain Iron locality, a large addition is being built to the steel corporation's machine shop at the mine of that name.

Considerable exploratory work is in progress in the eastern portion of the Mesabi range. It was in this district that the first ore was found in the Mesabi country, but the subsequent discovery of the great deposits to the west diverted attention from it and for some years the territory has been neglected. A number of drills are now in commission there, however, and it is the understanding that some ore is being found. The interests principally engaged in this exploratory work are the Great Northern railroad people, the Winnifred Mining Co. and George A. St. Clair of Duluth.

The Mayas Mining Co., the development of whose property in the eastern Mesabi was started only a few months ago, is making an excellent record. It is shipping upwards of 1,500 tons of ore daily and employing a force of only sixty-five men. Steam power is conspicuous by its absence, nor is any pumping done. The ore, located on a hillside, is mined and dumped directly into the cars by manual power. It is expected to ship fully 100,000 tons this season.

A new deposit of ore, the existence of which was not previously known, was encountered recently in the No. 8 shaft of the steel corporation's Soudan mine, Vermillion range. The shaft is being sunk 200 feet deeper to reach a body of ore which had been located by diamond drill boring, and it was while this work was in progress that the new find was made. Apparently the deposit is of large extent. It is reported in this connection that it is the intention of the steel corporation to reopen the old Lee mine, located half a mile northeast of Tower. This was formerly a possession of the Minnesota Iron Co., subsequently absorbed by the bigger company, and has been idle since 1892, when it was closed because of litigation since straightened out.

VALUABLE PROPERTIES

Acquired by the Jones & Laughlin Steel Co.—News From the Mines.

(Special Correspondence.)

Ironwood, Mich., June 16.—The Jones & Laughlin Steel company of Pittsburg, which during recent years has materially added to its ore reserves in the Lake Superior region, particularly in the Mesabi field, where under the name of the Interstate Mining Co., it has acquired a number of valuable properties, has further added to its holdings on the latter range by taking over the Meadow mine near Aurora. The Meadow, operated by George A. St. Clair, of Duluth, and associates, has been in course of development for some time past and has been brought to the producing stage, a spur track over which the ore is to go out now being completed by the Duluth & Iron Range road. The deal for the transfer of the property was negotiated by Capt. Thomas Walters, of Ishpeming, the Pittsburg corporation's manager of mines, and Capt. William White, who has been in charge of the company's Grant mine at Buhl, has been transferred to the superintendency of the Aurora acquisition. It is presumed that the development of the Meadow will be pushed and the mine will be operated steadily. A shaft has been opened to the ore body, and drifts extended from it. Outside of its Mesabi holdings, included among which is the Lincoln mine at Virginia, the principal Lake Superior possessions of Jones & Laughlin are located on the Marquette range. Its Lake Angeline mine, at Ishpeming, in the latter district, is one of the richest properties in the field and still an important producer despite its long years of operation. At Negaunee, on the Marquette range, it is opening the Rolling Mill mine, now sinking a shaft there to reach ore bodies previously tapped by diamond drills, and it is understood the company will take over Senator Alger's Volunteer mine, in the field to the south of that city. The Pittsburg corporation has some interests on the Gogebic range, but is not doing anything there at present. Its Jack Pot property, in that district, at one time gave promise of becoming an important producer, and its ore of high grade, but later developments were not satisfactory and work was suspended. It is at Jones & Laughlin's Grant mine at Buhl that the Hoover & Mason grab system of mining and stripping recently went into commission. This is the first apparatus of its kind to be installed on the Mesabi, or in the entire Lake Superior region, for that matter, and there is great interest in the results achieved. The test has been fairly satisfactory, on one occasion 300 yards of earth being stripped in two and one-half hours, but pending the rectifying of certain adjustments found necesary the big machine has not had full opportunity of showing what it can do. In theory, the grab system is designed to effect a material saving over the steam shovel method, and if the plan so works out, as is believed, its adoption at other Mesabi properties will doubtless follow, although because of the initial cost these extensions will be confined to the larger class of producers.

Stripping operations are starting at the steel corporation's Ohio and Norman properties at Virginia, and will soon be in progress on an extensive scale. The necessary track-laying has been in hand for some time past, and preparations are practically completed for a record-breaking season's work. The Pitt Iron Mining Co. is stripping the Wacouah property, adjoining the Rhodes Mining Co.'s Brunt mine near Mountain Iron. An unusual feature at the Wacoutah has been the fact that in order to secure water it has been necessary to extend a pipe line to the location from Mountain Iron. Excellent progress has been made in developing the Brunt, but because of delay in the arrival of the hoisting plant now in place, shipments have been retarded. The new shaft of the Hector mine at Biwabik has been provided, with railroad facilities, and that property will add its quota to Mesabi range shipments this season. Spur lines from the Great Northern road, which has secured the contracts for hauling the product of the properties, are being extended to the Nassau mine of the Rhodes Mining Co. and the Buffalo & Susquehanna proposition of Rogers, Brown & Co., both in the Hibbing district. The two mines are underground properties and are each expected to make a considerable shipment this season.

At its new mines in the Bovey field, on the Western Mesabi the steel corporation has adopted a system whereby the day and night shifts of men will each work two weeks before changing over with each other. The arrangement is much more satisfactory to the men than the former system of alternate weeks of day and night labor. The Duluth, Mesabi & Northern's fifty-five-mile extension to the district has now been completed to the Holman mine, the big bridge at the head of Lawrence lake having gone into

commission, and locomotives and steam shovels for use in the stripping work at the Holman have been delivered at the property via the railroad line.

The big Champion mine, a Marquette range property of the steel corporation, is to resume mining operations within a week or two. It has been idle for the past two and one-half years, having been closed down when still a possession of the Clairton Steel Co. in October, 1903, shortly after which the holdings of that concern were taken over by the bigger company. Three hundred miners will be employed at the start, and more will be added to the force as operations progress. The machinery has been overhauled or rebuilt during the past year, a large detail of machinists having been employed in this work, and the plant is now one of the best on the range. The Champion is an unusually deep mine, as far as iron properties go, its lowest level being down 2,266 feet. There were some 300,000 tons of ore in stock at the time of the suspension, the bulk of which has since been shipped.

The ore shipping record over the Chicago & Northwestern road from Ironwood to the Ashland docks was broken recently when in one day sixteen trainloads, 22,000 tons in all, were delivered at the lake port. This traffic was over a single track, and is considered somewhat remarkable considering the fact that on the day in question fifty-two trains of all classes were moved in each direction between the two points. Another achievement of the same nature was recorded at the Mesabi docks at Duluth when in twenty-four hours there were loaded into boats a total of 103,275 tons of ore, an hourly rate of 4,300 tons, excelling all past records. The shipments from the head of the lake up to the first of the present month aggregated for the three dock systems, those at Duluth, Two Harbors and Superior, 3,791,874 tons, compared with 3,787,073 for the same period in 1905. But for the marine strike earlier in the season the showing would have been materially better.

The Penn Mining Co. is making excellent progress with the work of harnessing Sturgeon falls, Menominee river, for the purpose of generating electrical power for the operation of its group of mines at Norway, and it is expected the new plant will go into commission before snow flies. A start has been made with the installation of the machinery. The steam engines will remain in place for use in case of emergency.

THE VALUE OF CANADIAN IRON ORE.

Editor IRON TRADE REVIEW:

There seems no reason to doubt that in northern Ontario there are vast deposits of iron ore. One such mass, known as the "Helen Mine" is part of the property of the Lake Superior corporation and there may be any number of other masses of more or less value, according to extent and quality. Some of the Ontario ores have been regarded as of doubtful value because they did not readily yield to the ordinary methods of smelting, but a change has been made in the situation by the discovery of the electric process, which was recently tested at Sault Ste. Marie with satisfactory results. It would argue incredible stupidity on the part of any administration if this change should be ignored in future dealings with this particular kind of raw material.

Heretofore the province of Ontario has derived very little revenue from the sale of mining lands, and it has never succeeded in securing any by means of royalties. It is time for a change in that connection. Iron deposits should no longer be treated as of little value. They should not be sold at all except to those who are able and willing to work them within a reasonable time, and they should be sold at such a price as would make them an important source of public revenue. If they are purchased with a view to being held for years without development, then, as soon as proof of such a purpose is available, the lands should revert to the crown. The people of Ontario have a better right to the unearned increment of value than mere speculative purchasers have. Metallic ores are not like pine trees. They will lose nothing by being left undisturbed in the earth, while the pine tree must be cut at maturity or its value will diminish with the progress of decay.

By well-ascertained facts regarding the comparatively early exhaustion of the high class ores of the lake district in America, complete exhaustion, at the present rate of consumption, will take place within fifty years. The Mesabi deposits will not outlast twenty-five years, and within the lifetime of persons now living the iron and steel industries of the United States will have eaten away entirely the country's workable supply as at present known. Inasmuch as the United States consumes 35-100 of the world's output, while possessing but approximately one-ninth of the world's ore deposit, the future economic policy of American iron masters should be to secure by all practical means the largest possible ore supply from the mines of other countries. Now one of the countries by which supplies may most accessibly be obtained is Canada, and possibly with this object in view, it has been no secret that for some time past much prospecting has been going on in northern Ontario, with the object of securing for great American iron and steel companies deposits of iron ore to be held in reserve against the impending scarcity. The United States Steel corporation is reported to contemplate the establishment of works of great capacity in some part of Ontario. If this enterprise is carried out—and the exigency of the time makes it certain that it will—there is no objection to acquisition of ore deposits, but, as far as Canada is concerned, the utmost precaution must be taken that no colorable scheme be worked as a mere excuse for holding undeveloped large beds of iron ore for future transportation unsmelted to the United States. An absolute condition to the sale of iron deposits hereafter should be forfeiture of the property when development ceases, no matter whether the parties are Americans or Canadians.

Canada possesses immense resources of magnetite, but which hitherto have been of little commercial value, owing to foreign admixtures, but Dr. Haanel's achievement in electric smelting, which, by his statement, "admits of immediate commercial application," is of great significance. It means that within a decade miniature Sheffields and Pittsburgs, only without their smoke, will be formed near Canada's numerous waterfalls and rapids, sending their finished products of iron and steel to all parts of the world.

J. A. MACDONALD.

Ottawa, Canada, June 10, 1906.

Will Locate at Sandwich. — The Canadian plant which the United States Steel Corporation is expected to erect within a short time will be located at Sandwich, Ont., where two large farms have been purchased outright and options on adjoining land have been renewed. About two square miles of land in Sandwich West township on the river front, three miles below Windsor, are available. According to reliable reports, options were taken at Port Colborne, Collingwood and Sarnia as well, but the Sandwich site has evidently been decided upon. The land is perfectly level, and any amount of dockage can be secured, as the Detroit river is very deep at this point. On the American side, a mile away, is Zug Island, the terminus of the D. T. & I. railroad, penetrating the coal regions of Ohio and West Virginia. On the Canadian side the location can be easily reached by the Grand Trunk railway, Pere Marquette and Michigan Central routes.

MISSED A BIG ORDER.

Which Was Taken by the Steel Corporation—The Explanation.

Toronto, Canada, June 16.—Frederic Nicholls, of the Canada Foundry Co., Toronto, and largely interested in the Dominion Iron & Steel Works, contradicts the statement that the former company proposed to establish a large car wheel works at Fort William, Ont. A company bearing the name of the "Canadian Foundry & Iron Co." is negotiating with the Fort William municipal authorities for a $20,000 bonus as a condition to the establishment of such an industry, but it has no connection with the "Canada Foundry Co."

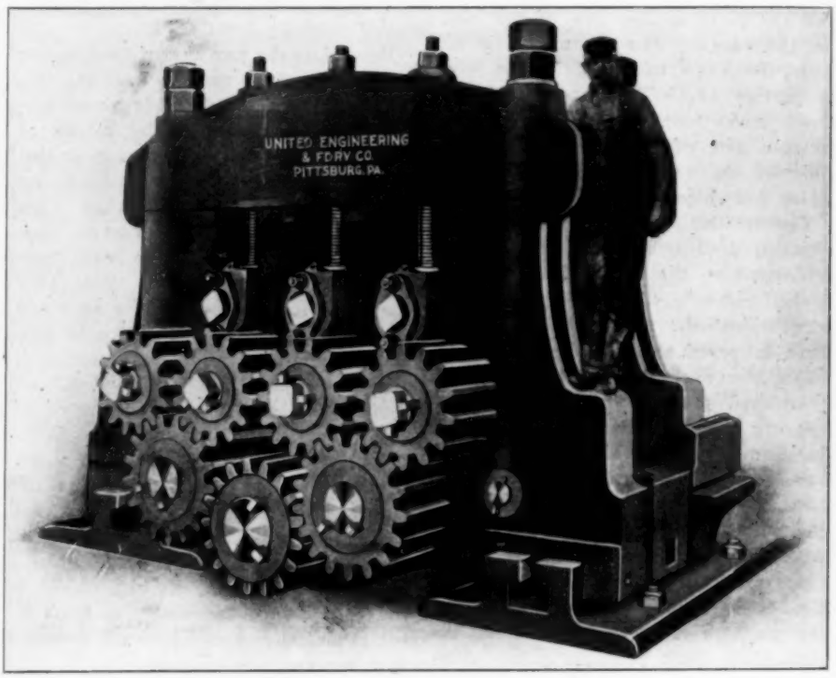
Speculation has for some time been rife in industrial circles as to why a recent order for 50,000 tons of steel rails for the Grand Trunk Pacific railroad was placed with the United States Steel Corporation, when the Dominion Iron & Steel Co., as is now admitted, is in a position to undertake the contract. Private information of a thoroughly reliable character is to the effect that negotiations between F. W. Morse, chief executive of the G. T. P. and Manager Jones of the Dominion company were entered into and broken off on acount of what the railroad magnate regarded as the exorbitant demands of the latter. The steel company refused to accept the contract except at a rate only 50 cents per ton less than the price of American rails laid down in Canada, plus the Canadian duty. This, with the bounties added, would bring the steel company's gross receipts to about $38 per ton. The contention of the railroad officials was that the consumer was entitled to participate to some extent in the benefits of the liberal measure of protection given to the industry. Decidedly strained personal relations resulted from the refusal of the Dominion company to make concessions, and the order went abroad accordingly. In view of this incident, the trade is watching with interest the outcome of the awarding of the contract calling for 65,000 tons for the eastern end of the line, the only possible Canadian tenderer, unless delivery is considerably postponed, being the Dominion company. It is understood that it is figuring more closely so as to get a share of this contract. Extensive purchasers of steel rods complain that the policy of the Dominion steel towards them is on the same lines of exacting the full American price and making no allowance for the bounty, while insisting on a vigorous application of the anti-dumping clause.

The ship building industry was never more prosperous. The Collingwood Ship Building Co. is closing a contract for the construction of a large steel freighter 500 feet in length for the Farrar Transportation Co., of Meaford, Ont. Another vessel of equal size is in course of construction in addition to smaller orders.

The iron and steel industry in Manitoba continues to grow steadily. The Western Iron Works, Ltd., has opened a new factory in Elmwood, Man., for the manufacture of architectural and ornamental iron work, iron fencing, etc. The Cooper Gasoline Engine Co., Ltd., has been incorporated with a capital of $50,000 and Winnipeg as head office. The incorporators are: Ernest Cooper, J. M. Cooper, Jas. Shutt, C. W. Bradshaw and Donald McEwen.

ROLLER STRAIGHTENING MACHINE.

The accompanying illustration shows a large roller straightening machine designed and built by the United Engineering & Foundry Co., of Pittsburg, for the Jones & Laughlin Steel Co. This machine is used for straightening structural shapes such as angles, I-beams, channels, etc., and has proved of great value as a labor-saving machine in steel works.



NEW ROLLER STRAIGHTENING MACHINE.

These machines are built to any desired size and capacity, and are capable of turning out commercially straight, all sizes of angles, channels, I-beams, Z-bars and T-bars, rails and other special shapes, rapidly and at a small labor cost, as the machine can be operated by one man and does not require skilled labor. After being once adjusted to the size material rolled, but little attention is required. They are strongly constructed, with all parts of ample size, and the repairs are reduced to a minimum.

The United Engineering & Foundry Co. has a large number of these machines in course of construction and has lately built several for straightening standard sections of rails. They are stated to be a vast improvement over the old-fashioned gag press, not only in the way they straighten the rails, but in the speed and minimum labor cost. One of these machines has been known to save the labor of twenty men and turn out as great a tonnage as can be put through ten gag presses. They are built for belt, engine or motor drive, and are equipped with rolls carried between the housings or with rolls overhung on the outside of the housings as may be desired.

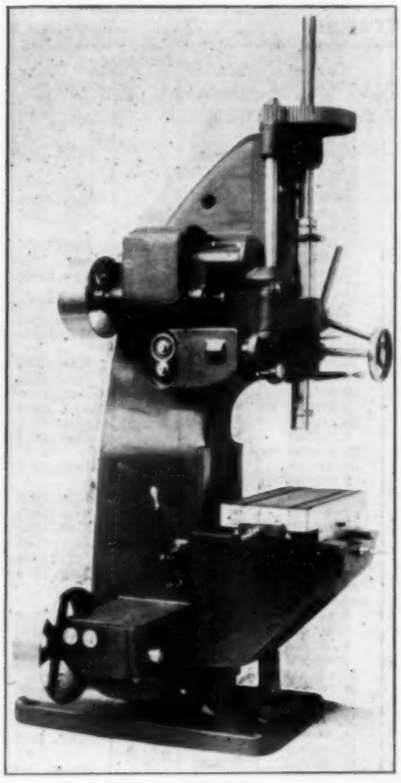
These machines will straighten material commercially straight with one pass through the rolls. This fact is due to various improvements which have been put into these machines, and while they cost a little more to install, the ultimate saving more than repays the extra first expense.

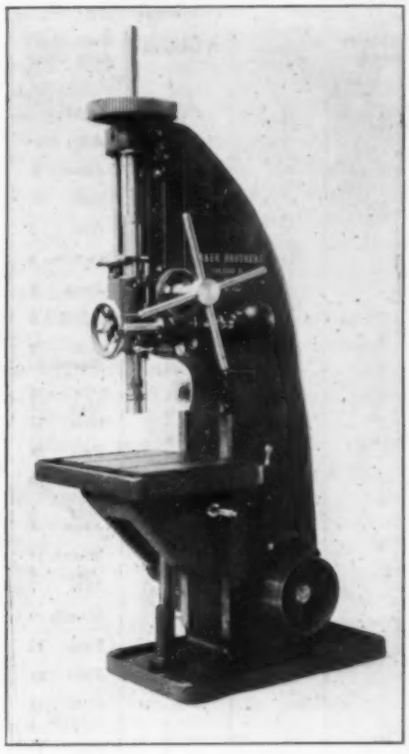
The Alquife Mines & Railway Co., Ltd., one of the largest iron ore companies in southern Spain, has begun the converting of its fine hematite ore into briquettes. For that purpose four horizontal kilns have been constructed, using producer gas for heating purposes. The briquettes are formed by machine and are then placed in cars which travel slowly through the kilns, coming out well baked and marketable. The iron percentage is measurably increased. Power for driving the machinery is derived from a river about six miles distant.

A NEW HIGH-SPEED DRILLING MACHINE.

The accompanying illustrations show a drilling machine designed to drive high-speed drills ranging from one-half inch diameter. The object of the design is to meet a large demand for a powerful drill capable of running continuously at high speeds. It is built by Baker Brothers, Toledo, O.

An enormous increase in production, it is well known, can be secured by the use of drills in high speed steel instead of carbon steel, but, in order to use them successfully, the machine must be so rigid that it will not spring appreciably under the great thrust due to a heavy feed. If the machine does spring the drill will bind in the hole and cause a demand for power, which may be several times the amount required for removing the metal. This extra power is converted into heat, which is not only objectionable in itself, but also still further expands the drill, thus increasing the trouble. Further, the drill when so cramped is very liable to break. The present machine has been designed to overcome these objections. The features kept in mind during the design were rigidity, ample driving power at high speeds, ease of manipulation, smoothness of running, wide range and durability.





BAKER BROS. HIGH SPEED DRILLING MACHINE.

The rigidity has been secured by a box column of liberal proportions. The upper portion of the column is eight inches thick, the table being gibbed to the front. The table is still further supported by the elevating screw, which is made heavy enough to take the entire thrust.

Driving power at high speeds is obtained by eliminating all cone pulleys, and using wide belts and heavy gearing. But little power is lost in the speed-changing device between the driving belt and the spindle. The machine has no ratchet nor friction drive, every drive being positive, with the exception of the intermediate belt, which is so proportioned that it will not slip under severe loads, but will act as a safety before the gearing can be damaged. The machine is capable of drilling a one and one-half inch hole in steel without the use of the back gear.

The speed changes are quickly and easily obtained by sliding gears. The machine can be started and stopped from either side and the feed can be changed while the tool is running. The feed changing handle is placed in a position where it is most convenient for the operator when standing in front of his machine. The change from power feed to hand worm feed or quick lever feed are all within convenient reach. The back gears are thrown in or out by pushing a rod. The table is raised and lowered by an elevating screw, the thrust being taken on ball bearings. A compound table may be used by means of which the work can be quickly and accurately centered under the drill after it has been clamped to the table. When so centered, it is not necessary to lock the table in place, and while one piece is being drilled, another may be chucked on the opposite end of the table.

The machine has eight speeds, varying from 25 to 370 revolutions per minute. This wide range adapts it for use in shops where both carbon and high-speed drills are used. A positive geared feed is provided having three changes and provision for compounding, making possible wide range of feeds.

Durability in this machine is secured by liberal proportions, good material and workmanship. The bearings are all bronze bushed and the shafts ground. All gearing is cut and the back and speed change gears run in oil baths.

Tests of the machine have shown that it will drill easily a one-inch hole in cast iron at a speed of 13½ inches per minute.

The principal specifications of the machine are given below:

Spindle travel, 16 inches.
Minimum section of spindle, 22 inches.
Diameter of minimum section of spindle, 2 inches.
Hole in spindle, No. 4 Morse taper.
Table, bracket type, 17 x 23 inches.
Compound table, 13 x 20 inches.
Travel of compound table, 10 x 18 inches.
Swing, 24 inches.
Number of speeds, 8.
Range of speeds, 25 to 370 R. P. M.
Number of feeds, 3.
Driving pulley, 12 x 3 inches.
Floor space, 3 feet, 5½ inches by 3 feet 5½ inches.
Floor space with compound table, 3 feet 5½ inches by 4 feet 5 inches.
Weight, 3,000 pounds.
Horsepower of motor required, 3½.

Metric System Investigated.—The Canadian Manufacturers' Association, representing the leading manufacturers of Canada between Halifax and Victoria, has requested the Canadian government to withdraw the McLennan lectures on the metric system and to take no action on weights and measures until something is done in this direction by Great Britain and the United States. The association also recommended that the chambers of commerce of the Empire, at the meeting in London this year, ask for a royal commission to investigate weights and measures and to report a system which would be acceptable. The manufacturers have been assured that the lectures given throughout Canada under the auspices of the Canadian government on the subject of weights and measures were organized for educational purposes only and did not indicate any official intention to adopt the metric system.

Stock Prices Sustain a General Decline.

The stock market of the past week was one of steady decline, with an occasional brief period of recovery providing a temporary check. Almost every security dealt in closed the week with a net loss and in several instances the decline was of several points. This sharp reaction, following a showing of strength the week previous, came without any legitimate reason and was generally ascribed to the disposition of large pool-ing interests to get rid of their holdings after they had come to the conclusion that the public would not relieve them at the level to which stocks had been pushed. The publication of government crop reports was taken as a depressing factor, although it was made clear that the wheat yield estimates were for almost record-breaking crops. Little attention was paid to this feature, but continuing reports of further crop-damage were widely exploited and did their part in hammering prices down. The securities of the Steel Corporation were leaders in the decline, for no other apparent reason than the report that, with the exception of rails, orders now on books were decreasing. There was no improvement in the bond market and corporations with unsaleable new issues will doubtless be forced to resort to short-term loans to bridge over their requirements until the market is in a better condition to absorb first-class securities. Call money rates became somewhat tighter during the week and the Saturday bank statement was not entirely favorable. Sales of the New York exchange for the week were 4,315,000 shares and bond sales aggregated only $12,424,000. Colorado Fuel, General Electric, Republic Iron & Steel preferred and Sloss-Sheffield suffered the heaviest declines in the steel and manufacturing field.

Recent dividend declarations include the following: Crucible Steel Co., regular quarterly on preferred, 1½ per cent, payable June 28; Sloss-Sheffield Steel & Iron Co., regular quarterly, 1¾ per cent on preferred, payable July 2; Otis Elevator Co., regular quarterly, 1½ per cent on preferred, payable July 15; Westinghouse Air Brake Co., regular quarterly, 2½ per cent, with the usual extra dividend of 2½ per cent, payable July 10; Tennessee Coal, Iron & Railroad Co., regular quarterly, 2 per cent on preferred and 1 per cent on common, payable Aug. 1; Garvin Machine Co., regular semi-annual 3½ per cent, payable July 2; Standard Coupler Co., regular semi-annual 4 per cent on preferred and a 2 per cent dividend on common, payable June 30; Canadian Westinghouse Co., Ltd., regular quarterly, 1½ per cent, payable July 3; Standard Screw Co., 6 per cent semi-annually in July and January; American Iron & Steel Co., regular quarterly, 1¼ per cent on preferred and a 2 per cent dividend on common, payable July 2; Empire Iron & Steel Co., regular semi-annual, 1½ per cent on preferred, payable July 1.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quotation June 16	Closing Quo. June 9	Changes	Date of 1906 Ann. Meet.	Par Value	Capital Outstanding	Dividend Basis	Dividend Being Paid	Dividend Date Last Div. Dec.
Allis-Chalmers Co	22⅛	21	−1⅛	Sept.	100	19,820,000			
Allis-Chalmers preferred	58⅛	57	−1⅛		100	16,150,000	7 cum	.....	Feb., 1904
American Can	7½	7¼	− ¼	Apr. 24	100	41,233,300			
American Can preferred	62	60½	−1½		100	41,233,300	7 cum	5 Q.	July, 1906
American Car and Foundry	41½	38½	−3	June 28	100	30,000,000			May, 1905
AmericanCar and Foundry preferred	102¼	100	−2¼		100	30,000,000	7 n. c.	7 Q.	July, 1906
American Locomotive	70⅜	69⅝	− ¾	Oct. 16	100	25,000,000			
American Locomotive preferred	115⅛	115	− ⅛		100	24,100,000	7 cum	7 Q.	Apr. 1906
American Shipbuilding	64	62	−2	Oct. 2	100	7,600,000	4	4 Q.	Apr., 1906
American Shipbuilding preferred	106	107	+1		100	7,900,000	7 n. c.	7 Q.	Apr., 1906
American Steel Foundries	12	11¾	− ¼	Oct. 3	100	17,700,000			
American Steel Foundries preferred	46½	45½	−1		100	17,700,000	6 cum	.....	Aug., 1905
Barney & Smith	65	65	.....	June 5	100	1,000,000		.....	June, 1894
Barney & Smith preferred	140	140	.....		100	2,500,000	6 cum	6 Q.	Mch., 1906
Bethlehem Steel	31½	28¾	−3	April 3	100	15,000,000		.....	
Bethlehem Steel preferred	88½	87	−1½		100	15,000,000	7 n. c.	7 Q.	May, 1906
Bullock Electric preferred	111	111	.....	Oct. 2	100	1,000,000	6	6 Q.	July, 1906
Cambria Steel	35⅜	36	+ ⅛	March 20	50	45,000,000	6	7 Q.	Mar., 1906
Cambria Iron	49½	49½	.....		50	8,468,000	4	4 S. A.	Apr., 1906
Colorado Fuel & Iron	56⅜	51¾	−4⅜	Oct. 15	100	30,132,000	7	.....	Apr., 1902
Wm. Cramp & Sons Ship & Eng. Bldg. Co.	22	22	.....	May 31	100	6,098,000	5	.....	Nov., 1902
Crucible Steel	13⅛	12⅝	−1	Oct. 17	100	25,000,000		.....	
Crucible Steel preferred	80	77½	−2½		100	25,000,000	7 cum	.....	June, 1906
Empire Steel	5	5	.....	Feb. 28	100	2,281,400		.....	
Empire Steel preferred	36	36	.....		100	2,500,000	6 cum	3 S. A.	July, 1906
Fay & Egan	93½	93½	.....	Feb. 20	100	1,000,000	5	5 Q.	Nov., 1905
Fay & Egan preferred	128½	128½	.....		100	1,000,000	7 cum	7 Q.	Nov., 1905
General Electric	172	166	−6	May 8	100	48,256,050	8	8 Q.	July, 1906
International Pump	54	51	−3	June 5	100	12,262,500		2	July, 1905
International Pump preferred	88¾	85½	−3¼		100	8,850,000	6 cum	6 Q.	May, 1906
Lackawanna Steel	71	71	.....	March 14	100	34,971,400		.....	
Lake Superior Corporation	20	19½	− ½	Oct. 3	100	40,000,000		.....	
Niles-Bement-Pond	130	130	.....	Feb. 7	100	5,000,000	6	6 Q.	May, 1906
Niles-Bement-Pond preferred	105	105	.....		100	2,000,000	6 cum	6 Q.	June, 1906
Otis Elevator Co	49	48	−1	March 19	100	6,350,300		2 A.	Apr., 1906
Otis Elevator Co. preferred	98	98	.....		100	5,589,500	6 n. c.	6 Q.	July, 1905
Pittsburg Coal Co	13⅝	13⅝	.....	Feb. 12	100	30,135,000		.....	
Pittsburg Coal preferred	54½	54	− ½		100	30,716,200	7	.....	Apr., 1905
Pressed Steel Car	52¾	49	−3¾	Feb. 21	100	12,500,000	3	3	Aug., 1904
Pressed Steel Car preferred	98½	98	− ½		100	12,500,000	7 n. c.	7 Q.	May, 1906
Pullman Palace Car	228	226	−2	Oct. 18	100	74,000,000		8 Q.	May, 1906
Railway Steel Spring	54⅞	51½	−3⅜	March 1	100	13,500,000		4 S. A.	Oct., 1905
Railway Steel Spring preferred	101½	101	− ½		100	13,500,000	7 cum	7 Q.	June, 1906
Republic Iron & Steel	30	29½	− ½	Oct. 17	100	27,352,000		.....	
Republic Iron & Steel preferred	105	98¾	−6¼		100	20,852,000	7 cum	7 Q.	Apr., 1906
Sloss-Sheffield	79	75	−4	March 14	100	7,500,000	5	5	Jan., 1906
Sloss-Sheffield preferred	108	108	.....		100	6,700,000	7 n. c.	7 Q.	July, 1906
Tennessee Coal & Iron	155	154¾	− ¼	May 15	100	22,552,800		4 Q.	Aug., 1906
U. S. Cast Iron Pipe & Foundry	51½	50	−1½	June 27	100	12,500,000		2	June, 1906
U. S. Cast Iron Pipe & Foundry preferred	93	92¼	− ¾		100	12,500,000	7 n. c.	7	June, 1906
U. S. Steel	40¾	38⅝	−2⅛	April 16	100	508,302,500		.....	Dec., 1903
U. S. Steel preferred	106	104¾	−1¼		100	360,281,100	7 cum	7 Q.	May, 1906
U. S. Steel 5's	99	97½	−1½		100	463,798,000	5	5 A.	
Virginia Iron, Coal & Coke	44	43	−1	Sept. 18	100	8,641,600		.....	
Westinghouse Electric	159	156	−3	June 27	50	20,996,350	10	10 Q.	Apr., 1906
Westinghouse Air Brake	147	149	+2	Oct. 2	50	10,990,450	20	20 Q.	July, 1906

NEWS FROM MANY INDUSTRIES.

New Buyers:—

The Van Dorn & Dutton Co., Cleveland, O., has increased its capital stock from $50,000 to $150,000 to provide for the enlargement of its plant. The improvements consist of additional equipment in the original plant and the erection of another new building.

The Davenport Locomotive Works, Rock Island, Ill., has increased its capital stock from $200,000 to $300,000.

The Illinois Steel Bridge Co., Jacksonville, Ill., has increased its capital stock from $20,000 to $100,000.

The Standard Foundry Co., Dayton, O., has been incorporated to conduct a general jobbing foundry. The incorporators are Samuel P. Greene, Cornelius Mahoney, George A. High, Wendell P. Anelemger and Arthur F. Lockwood.

The John Knape Machinery Co., Grand Rapids, Mich., has been organized with a capitalization of $15,000 to manufacture and sell all kinds of machinery and appliances. The incorporators are John Knape, Engelbert Vogt and John Pearm.

The Kuhner Engine & Machine Co., Rock Island, Ill., has been organized with a capitalization of $25,000 to manufacture machinery, gasoline engines and novelties and do general machine work. The incorporators are Frank G. Young, Harry E. Miller and Morris Heagy.

The Jann & Shank Mfg. Co., Chicago, Ill., has been incorporated with a capital of $10,000 to manufacture machine parts. The incorporators are J. H. Early, A. C. Hoffmann and M. Doherty.

The South Side Steel & Malleable Casting Co. is the name of a new corporation formed by Fred A. Lange, of the Crucible Steel Co., Fred Hildebrand and Fred Graff, for the erection of a plant south of Milwaukee's city limits. Employment will be given to several hundred men.

The W. F. Pothoff Co., Cincinnati, O., has been incorporated with a capitalization of $175,000 to take over the structural iron business of the Potthoff & Frey Iron Co. The incorporators are W. F., L. C. and C. F. Potthoff, Theodore Kluver and H. E. Barnes.

The Lizzie Lowman Co., Sheffield, Ala., has been organized with a capitalization of $40,000 to manufacture stoves, ranges and McKay harrows. The incorporators are B. J. Lowman, S. A. Lowman and J. L. Andrews.

The Richmond Hill Foundry Co., Richmond Hill, Queens county, N. Y., has been incorporated with a capital of $12,000 by Ernest Haussler, Brooklyn Hills; H. D. Tenplin, Plainfield, N. J., and Thomas Rochester, Richmond Hill.

The Shelbyville Foundry & Machine Works, Shelbyville, Ind., has been organized with a capitalization of $50,000 by S. J. Meyers, Frank E. Irwing and Carey D. John, of Shelbyville, and E. T. Spencer and N. A. Spencer, of Gregory, S. D.

The Princess Furnace Co., has been formed to take over the properties at Glen Wilton, Va., of the Princess Iron Co. D. S. Cook, of Riceville, Pa., the principal owner, has retired. Wm. W. Hearne, of Philadelphia, is president with J. E. Johnson Jr. general manager.

The Iowa Machine Works, Clinton, Ia., has been incorporated for $15,000 to build steamboats and other machinery. E. S. Reynolds is president, and J. F. McGinty, formerly with the Clinton Novelty Works, secretary and treasurer.

The Dunstan Mfg. Co., Lorain, O., has been organized with $30,000 capital by George Dunstan and others. The building of the City Foundry Co., has been purchased for the manufacture of a patent sewer trap.

The Raymond Foundry & Machine Co., Raymond, Wash., has been incorporated with a capitalization of $25,000 by Christopher Hanson, Ralph Gerber, Len E. Hunton and B. I. Jones.

The Conveying Weigher Co., incorporated with a capital stock of $125,000, will manufacture balances, scales, weighing and measuring appliances. The incorporators are: Roscoe I. Peterson, 17 Park Row; Louis Frankel, Hotel Albert; and Baxter Morton, 42 Broadway, New York.

James Ackroyd & Sons has been granted a charter to manufacture galvanized iron and copper cornices, etc. The capital stock is $25,000 and the incorporators are: James Ackroyd, Hildreth J. Ackroyd and Austin W. Ackroyd, all of Albany, New York.

The General Vehicle Co., mechanical and electrical engineers, and manufacturers of vehicles and motors has been incorporated with a capital stock of $1,750,000. The incorporators are: Philip S. Hill, 605 West 115th street; Frank M. Van Wagonen, 467 West 152nd street; Charles H. Clark, 206 West 103rd street, New York; H. T. Mead, B. L. Mason, East Orange, N. J.; M. J. Duffy, Jersey City, N. J.; S. S. Batt, Tarrytown, N. Y.

The United States Valve & Fitting Co. has filed articles of incorporation to manufacture valves and fittings of brass, wire, steel, etc. The capital stock is $16,000 and the incorporators are: Otto C. Drescher, 81 Hooper street, Brooklyn; James A. Stevens, 738 Sterling place; Thomas J. Carrier, 1190 Fulton street; William O. Thompson, 825 Marcy avenue, Brooklyn, N. Y.

New Construction:—

The Western Malleable Steel Co., Detroit, Mich., has its new drop forging plant nearing completion. This will consist of a forging room 75 x 100 feet and a die tool room building 30 x 100 feet. The tool room will be equipped with four Grey planers and three Becker & Brainard milling machines, six Hendy and Gould & Eberhardt shapers, two Schumacher & Boye lathes and two Pratt & Whitney die sinking machines, all to be driven by two electric motors of 10 horsepower each. Twenty-four drop hammers and presses have been ordered from the Toledo Machine & Tool Co. These range from 3,500 pounds down to 800 pounds, and are to be fitted with two line shafts, each driven by 40 horsepower motors. Crude oil will be used as fuel. One Chicago Pneumatic Tool Co. air compressor with a capacity of 700 feet a minute will be installed. The plant, which will cost about $100,000, will be in operation by Sept. 1, with a capacity of about 300,000 tons of finished high-grade forges a year. This department will be in charge of C. L. Bockus, formerly with the Consolidated Co., of Toledo.

The Cincinnati Screw & Tap Co., now located in Brighton, will move about Aug. 1 to Epworth Heights, in Loveland, about 25 miles from Cincinnati. The Victor Stamping Co, now located at Epworth Heights, is to erect a factory building for the Screw & Tap Co., with sufficient floor space to double the capacity of the present plant. The company has been at its present location for many years. J. A. Knecht is president and Joseph Warnke, secretary and treasurer.

The Middletown Car Works, Middletown, Pa., is to engage in the manufacture of steel freight cars. Plans are being prepared for a car shop, 70 x 400 feet, and a press shop about half that size. J. B. Taylor, 56 Pine street, New York, has charge of the construction work.

Official announcement is made that the Pittsburg railroad will improve the P. & E. docks at Erie, instead of abandoning them, as has been reported. Plans for the improvement have not yet been completed.

The National Lock Co., Rockford, Ill., has increased its capitalization from $50,000 to $100,000 to provide for the enlargement of its plant. A large three story factory is now under construction.

The Mitchell-Van Meter Co., Pottstown, Pa., manufacturing brass castings, is erecting a new core room 40 x 120 feet.

The Riley-Harrold Engineering Co., Columbiana, O., is erecting a factory building 80 x 200 feet, and will later add

a foundry. About 100 men will be employed when operations begin.

The Dickson Car Wheel Co., Houston, Tex., is erecting a car wheel foundry 150 x 323 feet of fireproof construction. Equipment is now being purchased.

The J. A. Fay & Egan Co., Cincinnati, states that it is not to erect a pattern shop at present, but may do so later.

Additions just completed by the Union Foundry Co., Fitchburg, Mass., practically double the capacity of its plant. A full equipment of machinery has been installed.

The Allis-Chalmers Co. is planning the erection of a club house for its office employes at West Allis, Milwaukee. The building will have a street frontage of one block.

The Covell Mfg. Co., maker of saw machinery, is to remove from Chicago to Benton Harbor, Mich., as soon as the necessary buildings can be erected. This, however, will require considerable time, and it is not probable the change will be made before winter. A foundry building, 60 x 175 feet, a machine shop, 50 x 250 feet, two stories, a power plant and storage buildings will be erected. The move is made to accommodate the company's increasing business.

The Hyatt Roller Bearing Co., Harrison, N. J., has broken ground for a three-story addition, 75 x 100 feet, to its machine shop, according to plans prepared by Samuel M. Green, of Holyoke, Mass. Less than two years ago an addition, 75 x 150 feet, two stories, was made, but rapidly increasing sale of standard shafting bearings and automobile bearings has rendered present facilities inadequate. A large variety of special machinery has been installed, and in the future all parts of the Hyatt bearings will be ground. A number of patents have been obtained on special machinery designed for this purpose, largely by Alfred P. Sloan Jr., manager of the works, and C. I. Shirley, chief designer. Additions under way will increase the company's output at least 50 per cent.

The Ludlum Steel & Spring Co., Pompton, N. J., has purchased a tract of 32 acres near Watervliet, N. Y., but for the present will not improve the property. The site was acquired as a matter of precaution at a time when the company was subjected to considerable annoyance at Pompton by towns-people who objected to the use of the highway by the company's traction engines and trailers in the transportation of its coal and freight. This difficulty has been adjusted.

Fires:—

The iron works at Seeleyville, Pa., owned by Smith & Robbins, burned June 4 with a loss of $15,000, two-thirds insured.

The foundry department of E. N. Cooper & Co., Harrisburg, Pa., burned June 3 with a loss of several thousand dollars.

The Heacock & Lawrence Iron Works, Portland, Ore., were gutted by fire June 9, with a loss of $25,000, partly insured.

The Capital Iron Works, Topeka, Kas., owned by Brooks & Brooks, were considerably damaged by fire June 11, the heaviest loss being in the casting rooms.

General Industrial Notes:—

No. 2 furnace of the Columbus Iron & Steel Co. was blown out June 16 for relining. It is expected to have this work completed and the furnace again in blast by Aug. 1.

The Buffalo Forge Co. and the Buffalo Steam Pump Co. will abandon their office in Columbus, beginning July 1, locating in Cleveland and Cincinnati, A. J. Vance taking charge of their interests in the latter territory and W. A. Rowe having in hand the Cleveland district.

Imports of various raw materials for use in the manufacture of iron shattered all records during May, when 182,000 tons of iron ore, manganese ore, chrome ore, iron pyrites and pig iron were brought in. A large proportion of this came from the Cuban ore properties of the Pennsylvania Steel Co.

The plant of the Bloomington Stove Co., Bloomington, Ill., was recently sold at auction to W. G. Bayce & Son for $10,100. The company was organized in 1870 and was prosperous for years, but lately has been unable to operate at a profit.

The Advance Machinery Co., Toledo, O., has purchased from Kieper Bros. the old plant of the Union Mfg. Co. The building will be enlarged.

The Mountain City Foundry & Machine Co., Greenville, S. C., has purchased the plant of the Palmetto Iron Works, which will be consolidated.

R. W. Johnson recently purchased for the Brunswick Refrigerator Co. the plant of the National Water Tube Boiler Co. from Henry G. Parker, trustee and receiver, for $60,000. The new owners will continue the boiler business.

The Brackett Bridge Co., Cincinnati, has been thrown into involuntary bankruptcy, with liabilities in the neighborhood of $100,000. This action is said to have been forced by the filing of a number of suits against the company charging violation of the Valentine anti-trust law.

Trade Notes:—

The Westinghouse Air Brake Co. is to supply an electric pneumatic brake system for 45 cars on the Boston elevated traction system, and for 50 cars for the surface line of the same company.

The South Atlantic Car & Mfg. Co., Savannah, Ga., is to build 300 flat cars for the government work on the Panama canal.

The Westinghouse-Church-Kerr Co. has been awarded the contract for the electrification of that part of the Rochester division of the Erie railroad between Mount Morris and Rochester, a distance of 35 miles.

The Cincinnati Machine Tool Co., to accommodate the increasing demand for its product, has recently installed a large amount of new equipment, including one planer, two gear cutters, one milling machine, two lathes, one radial drill and a special polishing department. The purchasing of considerable additional equipment is contemplated.

F. H. Bultman & Co., Cleveland, were recently awarded a large order of racks, 10 feet 6 inches long, 4⅜ inch face, with a 1½ inch pitch, by the Panama Canal Commission.

The Ward Fence Co., Portland, Ind., is in the market with a complete line of attractive fences of steel for enclosing residences, parks and the like.

The Carnegie Steel Co. has contracted with the Penobscot Building Co., Detroit, for a large safety deposit vault of armor plate. It will weigh upwards of 400,000 pounds and it is stated will cost about $100,000.

Recent contracts closed by the Crocker-Wheeler Co., Ampere, N. J., include three one-horsepower motors for the Wellman-Seaver-Morgan Co., Cleveland, and two 75 K. W., 240 volt, generators for the American Fork & Hoe Co., Ashtabula, O.

TRADE PUBLICATIONS.

The Garden City Sand Co., Chicago, has issued a catalog of cupola blocks, in which are described cupola blocks of various qualities, sizes and shapes, together with firebrick and brass furnace linings. Examples are given for the computation of the number of bricks required to line various sized cupolas and furnaces and a table of dimensions of blocks is also incorporated in the catalog.

The Brown Hoisting Machinery Co., Cleveland, is distributing a pamphlet just issued describing the "Brownhoist" locomotive crane, fitted with grab buckets for handling coal, ore, sand, etc. Numerous illustrations are given, showing this crane in use at railroad coaling stations, coal storage plants, etc. Line drawings and tables of dimensions in the catalog give information regarding sizes of the various cranes.

W. L. McCulough Co., Ypsilanti, Mich., in a recently issued catalog describes the National ore pulverizer, which, it is stated, will pulverize any material down to 100 mesh and finer, at a high rate of speed. The catalog has illustrations of the machine and results of tests.